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ROYAL CANADIAN MOUNTED POLICE

GAZETTE

SERVING THE POLICE COMMUNITY SINCE 1938

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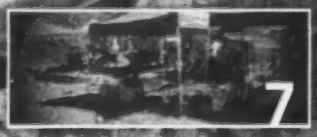
FORENSICS
FROM THE FIELD TO THE LAB

Challenges spark innovation
Evidence recovery at the Pickton site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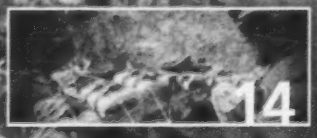
CSI: Kandahar
Countering IEDs through science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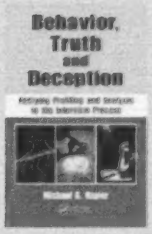

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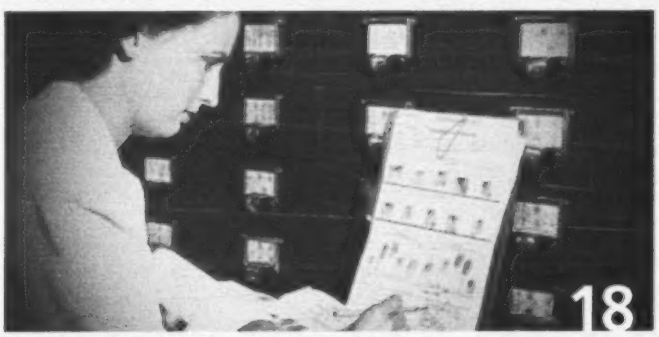

NOT YOUR USUAL SUSPECTS

NEW DECADE. NEW LOOK.

Much like the policing environment, where challenges in the field and advances in technology prompt new approaches and innovative techniques, the publishing world must also adapt and change.

While the content is still of the calibre readers have come to expect, we've made some changes in both look and feel to allow for a fresher, more accessible magazine. The *Gazette*'s last major changes were unveiled in a 2003 edition on forensic science, so it's only fitting that we revisit the topic for our re-design.

That particular issue of the magazine focused heavily on DNA, which is still an integral part of the forensics field. But thanks to the proliferation of crime procedurals on television such as *CSI* and its spin-offs and rip-offs, awareness of the value of DNA in police investigations, regardless of the accuracy of their portrayal, is arguably at an all-time high. It's become the usual suspect.

That's why we're delving into the other areas of forensics that don't always receive the Hollywood treatment.

And while the sensationalized details of the Robert Pickton serial murder case, in which DNA played a key role, might seem ripped from a television or movie script, they overshadow the untold story of how forensics teams tackled the enormous size of the crime scene and the thousands upon thousands of samples of evidence that needed to be processed. As Mallory Procunier reports, the challenge required the RCMP to develop new techniques that have now become best practices.

Whereas *CSI* may have broadened its fiction beyond Las Vegas to Miami and New York, the *Gazette* brings you the raw reality of a different type of crime scene in Afghanistan, where RCMP-trained members of the Canadian Forces examine improvised explosive devices to learn key pieces of information that help target insurgents and ultimately save lives.

From the battlefield to the business world, forensic accountants Peter Dent and Margie Peeters explain how financial statements and balance sheets prove to be a wealth of evidence when looking for fraud.

Down under in Australia, soil scientist Dr. Rob Fitzpatrick describes why soil is increasingly becoming a crucial piece of evidence in criminal cases because of its distinct properties.

Back in Canada, contributing writer Eric Chouinard chronicles how tire tread marks help tie a missing person case to a double murder.

But what if the facts and evidence are embedded in words and behaviours that can't be bagged or processed? That's where forensic interviewing plays a role. As the Canadian Police College's Scott McLeod writes, there are two leading approaches that police should evaluate before proceeding.

We also tackle the issue of objectivity in our panel discussion, where our experts examine the perception that the results forensics practitioners produce could be biased in favour of the police they work for.

In our regular departments, read about how Environment Canada and Interpol are cracking down on wildlife crime, how police in Northern Ontario are tackling a spike in Oxycontin-related crimes and how the Australian police are incorporating Twitter into their road safety awareness campaigns.

We also welcome you to visit us online where you can download back issues as well as follow us through the RCMP's RSS feeds, Facebook page, Twitter account and YouTube channel.

STAY CONNECTED. STAY INFORMED.

— Richard Vieira

GAZETTE

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CANADIAN AMBER ALERTS GO WIRELESS

Canadians are now able to receive potentially life-saving Amber Alert messages from all across the country on their cellular phones thanks to a partnership between the Royal Canadian Mounted Police, the Canadian Wireless Telecommunications Association (CWTA) and the provinces and territories.

Amber Alerts, which were pioneered in the United States in the late 1980s and are now used in Canada as well as Australia, France, Switzerland, Greece and the Netherlands, not only quickly inform the public when a child is abducted but they also provide immediate updates and details that may help identify and safely locate and return the child.

In Canada, police forces of jurisdiction in individual provinces and territories traditionally deliver this information using widespread media broadcasts.

Only police can activate an Amber Alert, but non-profit organizations such as Child Find Canada and the Missing Children Society of Canada also assist in getting the message out.

As a result of the new agreement, the RCMP's National Missing Children Services now coordinates and transmits Amber Alert information through the CWTA on behalf of all provinces and territories.

The information is then sent by text message to Canadian cellular phone customers who subscribe to the completely free service.

And while police in the provinces and territories will continue to issue Amber Alerts using the media and other more traditional methods, they now have access to a single means of communicating each and every alert to the Canadian public as a whole.

"Sending Amber Alerts via text message will be an effective communication tool and will assist us in quickly soliciting the public's help in the recovery of missing children," says S/Sgt Monique Perras, the officer in charge of the RCMP's National Missing Children Services. "This joint initiative will help ensure the safety of children and help reduce their victimization."

— Richard Vieira

YOUTH PROGRAM LAUNCHES SITE FOR PARENTS, POLICE

DEAL.org, the RCMP's by-youth, for-youth crime prevention website, is making room for mom and dad.

Created in 1997, the popular online resource unveiled an improved and redesigned site last year. In addition to a new look, the site's monthly webzine was replaced by regular blog-style posts to keep up with the pace of online media.

Now, the award-winning DEAL.org, which profiles positive youth-led initiatives across Canada and raises awareness about issues such as bullying, drugs, impaired driving and dating violence, has created a destination specifically for parents, police and other adults.

"Our goal is to help young people realize their full potential by promoting positive relationships with family, friends and members of the community," says Erin Mulvihill, manager of the RCMP's Youth Engagement Section, which publishes DEAL.org. "Expanding to better serve our other audiences will allow us to continue to do just that."

The companion site will tackle the same issues as the DEAL.org site, but will use a youth perspective and research-based information to educate parents, educators, youth workers and police on how to best support those who are dealing with them.

"Sometimes it's hard for young people to approach their parents about issues they're facing," says Mulvihill. "And many adults, including police officers, are not always sure about the best way to talk to or approach children and youth about difficult subjects, which is why we outline some general guidelines to keep in mind."

In addition to tips for engaging youth on a daily basis, the site also offers fact sheets and a toolbox of presentations for adults to use. Each topic has a downloadable presentation, a complete presenter's script, icebreakers and other activities to help present to a youth audience.

Visitors to the site can also subscribe to a monthly newsletter for updates on new projects, events and topics covered on all DEAL.org websites.

"We hope our family of websites will ensure open lines of communication exist between youth and adults because communication is essential to successful youth engagement," says Insp Shelly Dupont, Officer in Charge, National Crime Prevention Services. "We can't help youth if we don't understand the issues they're facing."

— Richard Vieira

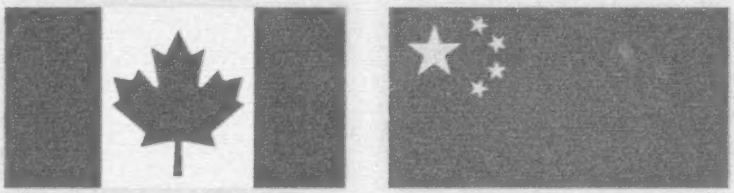
The RCMP's DEAL.org has launched a website to help police, parents and other adults better engage youth.

RCMP

CANADA, CHINA RENEW POLICING AGREEMENT

Canada and China have renewed an agreement that facilitates cooperation between the two countries' national police agencies, the Royal Canadian Mounted Police and the Ministry of Public Security, respectively.

The Canada-China Memorandum of Understanding (MOU) on Cooperation in Combatting Crime allows for information-sharing on suspected criminal activities and mutual assistance in locating evidence and suspects.



The goal is to fight transnational crime and repatriate fugitives in accordance with each country's laws and procedures.

"As criminal activity shows as little respect for international borders as it does for national laws, cooperation between law enforcement agencies has become a necessity," says A/Commr Mike Cabana of the RCMP's Federal and International Operations.

In addition to co-operation in crime prevention and criminal investigations, the renewed 10-year agreement, first signed in 1999, facilitates the exchange of knowledge and expertise in the areas of police training, technology and equipment.

The continued success of the agreement is due in part to the work of RCMP Liaison Officers (LOs), who have been stationed in China since 2000, helping both Canadian and Chinese law enforcement agencies further investigations in each respective country.

And as China becomes a larger force on the world stage, the role of LOs is also becoming increasingly important.

"As immigration increases and a larger (Chinese) population forms in Canada, there will be more trade between countries and more crime that goes along with that," says Insp Yves Goupil, who recently returned from working as an LO in Beijing for three years.

"There are more Canadian companies doing business in China and vice versa, giving LOs an even tougher job."

A closer working relationship and open communication will be crucial in the coming years, but Cabana says he is proud of the progress already made in the first 10 years of the agreement.

"There is more of a will now from the Chinese to work together," says Cabana. "And we are entering talks on how to further enhance this collaboration."

Now that the MOU is signed, both sides will be working towards an agreement on the sharing of proceeds of crime, among other areas of co-operation.

— Richard Vieira, with files from Mallory Procunier

STUDYING MEMORY UNDER STRESS

A ground-breaking new study suggests that police officers who have experienced stressful, life-threatening situations may not be able to fully remember the event.

The Winnipeg Police Service (WPS) hosted the Force Science Institute (FSI), a scientific research group that investigates force encounters, for a study aimed at evaluating officers' ability to retain information following serious physical altercations.

Fifty-two police officers were subjected to a physically and mentally exhausting series of tests. The volunteers were required to go all-out attacking a 300-pound water bag. Having reached the point of exhaustion — in many cases after just 30 seconds — they then sprinted to a trailer where they briefly confronted a threatening individual.

Afterwards, officers were given a brief rest and then asked specific details about the incident.

Many officers could not recall information before, during and after the event.

"What we found was amazing," says Patrol Sgt Jason Anderson, supervisor of WPS's officer safety unit. "When somebody is going 100 per cent all-out, they can't attend to what seems unimportant to that encounter at the time."

Anderson says he hopes the findings will impact how police are trained, how they are prepared for the natural responses they will experience and how they are treated during interviews and on the stand.

Television and movies, according to Anderson, have given the public a distorted perception of an officer's capabilities. He says he hopes this study will help differentiate ideals from reality.

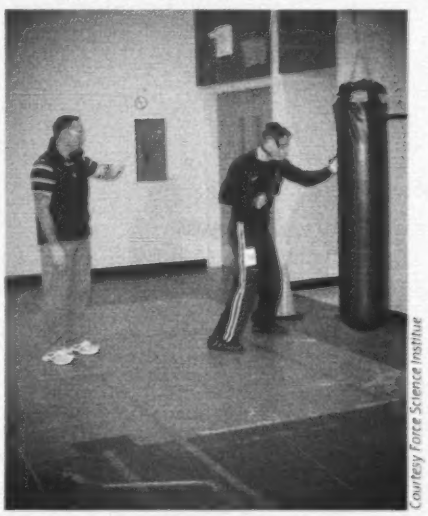
Dr. Bill Lewinski, executive director of the FSI, says that officers may sometimes need the use of memory enhancers — such as scene walk-throughs to stimulate their memories.

"We have to remember that we recruit officers from the human race and we cannot expect superhuman performances from them," he says. "They are well-trained humans but humans nonetheless."

In the future, the FSI plans to take this study further by looking at how officers make decisions under extreme exhaustion.

— Sigrid Forberg

A member of the Winnipeg Police Service goes 'all-out' attacking a water bag while his heart rate and oxygen levels are monitored.



Courtesy Force Science Institute

Vancouver PIS

Pickton's farm was sectioned off into 216 grids to help organize searches.

INVESTIGATING WITH INNOVATION

BREAKING FORENSIC BOUNDARIES AT THE PICKTON PIG FARM

By Mallory Procunier

For the past 20 years, Vancouver's Downtown Eastside has seen dozens of women go missing. In an attempt to trace their whereabouts, the RCMP and municipal police agencies came together to form Project Evenhanded, whose resources and efforts eventually led investigators to Robert Pickton's pig farm in Port Coquitlam, British Columbia in February 2002.

What they saw would immediately impact even the most seasoned police officer.

PROCESSING THE MAGNITUDE

A mess of a scene greeted investigators. Mud-caked structures and pieces of refuse were scattered about the property.

Heavy excavation machinery sat idle on the partially developed land next to heaping mounds of unearthed soil and fill that reached heights of almost 40 feet.

Manure sewage ponds also lay stagnant on the site that was considered a forensic nightmare.

"When any new examiner first arrived at the farm to conduct examinations, it took them about two days to digest what they were seeing," says Peter Samija, general

manager of the RCMP's National Forensic Services laboratory in B.C. "The farm was so large, so dirty and had so many potential sources of DNA that it was hard to swallow."

Forensic Identification Services (FIS) initially began by looking at the scene two-dimensionally to break it down and figure out what it was they needed to act on first. "You're taking what you learned in the lab and simple crime scenes and getting past that overwhelming feeling by applying what you know to what's in front of you," says Ret Sgt Tim Sleigh, the former officer in charge of FIS during the Pickton investigation.

But a scene of this magnitude required a whole new approach to evidence collection. And taking best practices from previous ground searches was difficult as the size and scope of the Pickton farm was unprecedented.

Thinking outside the box, S/Sgt Randy Hundt drew connections between the state of the Pickton farm and the site of the World Trade Centre attacks in New York City.

Hundt, who was the lead on search efforts at the Pickton farm, organized several investigators to travel to Ground Zero to survey what methods ground search teams there used to recover evidence in a non-traditional environment.

FIS then modeled its ground search after best practices used at Ground Zero, based on what methods worked, what hadn't worked and what they needed to overcome.

Yet before evidence recovery could begin, health and risk assessments took precedence. Several of the buildings on the farm were dilapidated and at risk of falling, many hypodermic needles were buried in the soil and several of the structures on the property were rampant with rats.

"Very often, we had to get rid of the rats before we could begin searching a building," says Ret Insp Martin Thompson, who led FIS through the investigation. "Sometimes the investigation was held up by a month to just get rid of rats in one area."

ORGANIZING CHAOS

Once the go-ahead was given, teams began to move in. Since the site was so large and possibly contained incalculable sources of DNA, searches had to be conducted systematically. Each of the 10 buildings on the 17-acre property was designated as a site, which was then broken down into smaller sections to make it more manageable.

"They say the way you eat an elephant is one bite at a time, and that's what we had to do. We made the search systematic and careful by first focusing on one area, such as a trailer, then a room in that area, then a small portion of that room," Samija says.

Before plans were executed, however, theories were first tested in a series of experiments to ensure important evidence would not be tampered with or missed. Many artefacts were thought to be buried in the soil, so FIS buried several items of its own and let them sit for a period of time before extracting them and testing for the presence of DNA.

"This gave us a picture of what is suitable for testing after being buried and exposed to dirt," Thompson says. "We found that if things were buried for any length of time, the DNA did not survive."

FIS then began to set up a structured method of evidence collection. Starting in one section of the land, teams would move across the property, collecting evidence sequentially. If information was received from investigators about a specific area on the property, that information was filed and reviewed once that area was reached. This ensured that no evidence was overlooked.

"Normally, [FIS] just moves in and begins processing the scene. With this case, the file was so fluid and dynamic that our priorities were always changing as a result of the information constantly coming in from the ongoing investigation," Thompson says.

Precision had to be paired with efficiency as teams needed to work quickly to come up with substantial exhibits to extend the search warrant. To do this, FIS and forensic lab specialists formed teams that combined the expertise of both.

This allowed FIS investigators to be better informed of potential exhibits and prioritize what could be put forward first to establish a link between the scene and a victim.

Bridging this gap between civilian lab specialists and FIS members allowed one to better understand the other's role and brought scene capabilities to a whole new level.

"We formed a partnership in an area that traditionally belonged to the lab and forensic recovery. If we hadn't done that, we would probably still be there recovering today," Sleigh says.

UNTRADITIONAL METHODS

With FIS and the lab working hand in hand, evidence recovery was underway. Due to the nature of the file, FIS investigators became very accustomed to thinking on their feet. Much of the evidence required skilful and innovative methods of extraction and a new perspective on traditional tools or instruments.

One of these tools was an alternate laser

Robert Pickton's pig farm in Port Coquitlam, British Columbia.

Vancouver FIS

light source that was used to highlight the presence of fibres and chemical compounds at the scene. Traditionally, FIS used UV light to highlight this type of trace evidence, which came with a risk of causing melanoma and eroding the DNA with its harsh heat. Developed from a pharmaceutical product specifically for this investigation, the new portable laser light source emitted far less heat and was much safer.

"Using these light sources on the farm, we found all sorts of different applications for them — fingerprints were fluorescing without the need of any powder, and we found bloodstains and evidence that had been ground off or painted over," Sleigh says. "It also reduced how destructive we were to property and the risky exposure to our officers."

One of the most unique methods was the use of an ultrasound machine to examine the possibility of frozen remains hidden within blocks of ice inside one of the large, deep freezers found on the farm. FIS borrowed the equipment from the British Columbia Institute of Technology (BCIT)'s medical imaging school to look inside the freezer without having to cut into the ice and risk damaging any evidence.

But even with trained BCIT ultrasound operators on scene, the technology was not as useful as they had hoped.

"It wasn't that successful, but it did open doors to making members think of alternate ways of extracting evidence, as well as establishing a new partnership with BCIT," Thompson says.

Several tried and true processes were modernized for the investigation as well, including the means by which evidence is documented. Film was the medium of choice for years, even after the introduction of digital photography, because tangible film photos were more reliable and secure.

However, as the investigation progressed, FIS realized that the film system was not efficient enough to send photos quickly and began to fully embrace digital photography.

"Although film was still used for archiving in Evenhanded, digital photography was important to release evidence in an almost immediate manner to field investigators, and to make thousands of photos searchable and catalogued," Sleigh says.

Ground-penetrating radar was also used, but not in the traditional sense. Normally, this equipment would be dragged over a surface, such as a field, to show disturbances underground and indicate whether or not an excavation was necessary. This time, however, FIS had other uses in mind.

Vancouver FIS

Civilian osteology experts sort through dirt on a conveyer belt, attempting to distinguish artifacts between animal and human remains.

"Knowing the history of ground penetrating radar like I did, and how it had been used in the past to check inside walls for hidden compartments or pockets, we knew it would be useful," Thompson says.

Thompson commends FIS on the quality of its searches, which in some cases brought the term "finding a needle in a haystack" to an almost literal meaning. While searching through several bales of hay on the property, investigators were so thorough that they actually extracted individual rat teeth from the mounds.

Partnering with FIS's unique evidence recovery methods was the lab's grid swabbing technique. To tackle large portions of a dirty area without cross-contaminating evidence, technicians divided areas into squares that ranged from half an inch to two inches, depending on the exhibit.

Beginning with the deep freezers, they swabbed noted stains and blood spatters within each individual square, which ensured that only single sources of DNA were extracted from each area.

"We didn't want to artificially generate mixtures of DNA. We were worried that if we went in and swabbed large areas that were not defined stains, we were going to create multiple mixtures of DNA profiles and not be able to interpret anything," Samija says.

The grid method was effective, but was draining on supplies and personnel. It was also extremely time-consuming because FIS members had to be trained by lab specialists to swab the grid, and each individual swab had to be analyzed.

"We realized quickly that if we were to do a grid search of all the buildings, we were looking at 11.9 years of work," says Dr. Kathy Horley, biology reporting officer at the National Forensic Services lab in Vancouver.

To speed up the process, the lab introduced a robotic automated system that processed 75 swabs in one batch, which eliminated years of work. This was not the protocol used anywhere in the world at the time, so lab specialists had to develop and validate a technique for processing thousands of swabs.

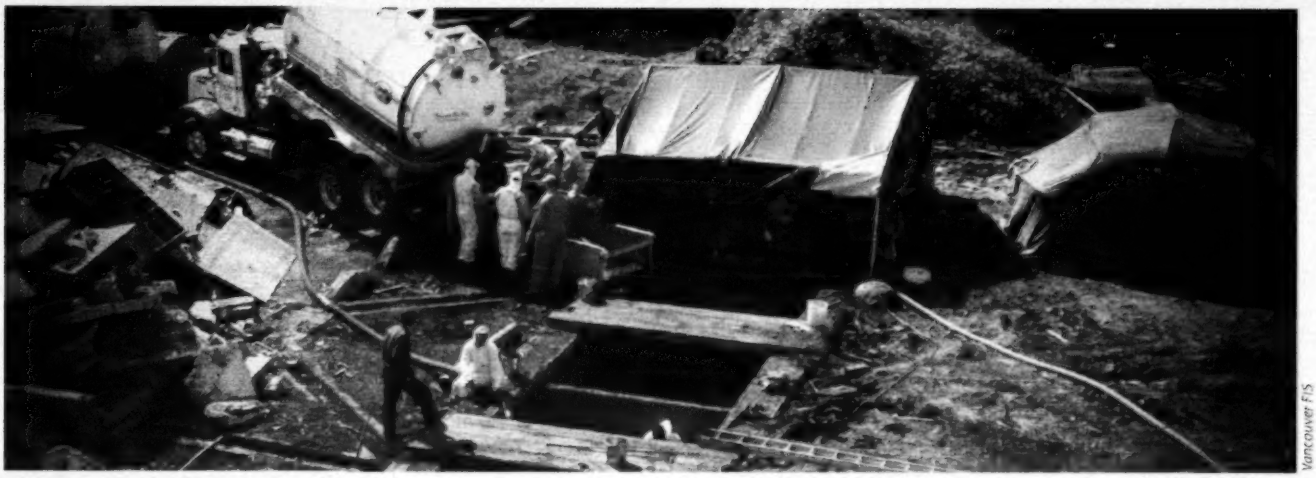
By running the robots every minute of the day, every day, the lab was able to process over 108,000 swabs in only three months – compared to roughly less than 10,000 per year by previous methods.

"At that point, we were the most cutting-edge lab in the world," Horley says.

COLLABORATIVE EFFORT

Even with state-of-the-art technology and improvements on traditional methods, this investigation would not have been possible without the help of hundreds of civilian workers and police officers from across Canada.

One hundred and eight FIS officers



Vancouver FIS

Teams drain Pickton's cistern, where they located one tiny fragment of bone, which happened to be the only retrieved source of DNA from one of the missing women.

from as far east as Quebec answered the call for help, including Cst Fred Strikwerda, a retired FIS member who became involved with the Pickton investigation as a member of the Vancouver Police Department. Strikwerda's curiosity got the best of him in February 2002 — and one day in the field turned into the longest amount of time any FIS member spent on the case.

"I was fortunate enough to have the opportunity to work with many different people from many different backgrounds," Strikwerda says. "We were tasked with very unusual tasks that weren't normal for FIS workers and in doing that, you get to see the different ways people respond to the challenges they are presented with."

Several behavioural science specialists from the Federal Bureau of Investigation (FBI) as well as members from the Australian National Forensic Crime Lab attended the scene, but from a training point of view to learn from Canada's best practices.

Another 110 different anthropology and archaeology search technicians were also brought in for the first time, opening doors for greater civilian involvement in these types of investigations.

"Traditional thinking was that only police officers were allowed in a crime scene during the execution of a search warrant," Thompson says.

"Because of its success in the Pickton case, it is now almost routine in the Lower Mainland [of B.C.] to have civilian members from the lab attending serious scenes."

Strikwerda says he credits the supervision and management of the investigation for the success in breaking down such a large crime scene, as well as the respect and positive attitude among those involved.

"Everyone was patient to work on the results and ensure the investigation was carried out the right way," he says. "It was gratifying to have the freedom to spend the time and get the evidence, and this really brought the best of people together."

In late 2007, Pickton's trial came to a close with a conviction of six counts of second-degree murder.

Following the trial, investigators held a post-mortem, where details of what worked and what didn't during the investigation were discussed.

Most of the innovative methods used in the case are still in practice today and will continue to be used for Project Evenhanded to track down the remaining dozens of missing women. And the strong partnerships that were formed still remain strong.

"The national policing community will benefit from some huge strides forward coming out of the lessons learned on this file," Sleigh says.

"It's the combination of the team approach and the way we followed the lab's lead in conducting an experiment before proceeding that contributed to our success."

BY THE NUMBERS

FIS members involved on the file
125

Fingerprint impressions developed
543

Photos taken
132,125

Exhibits collected
76,000+

Elimination samples processed
800

Swabs processed through robotics
108,222

DNA swabs collected
500,000+

Cubic yards of soil screened
383,495

Cubic yards of soil sifted
1,000,000

TRACE THE TRACKS

TIRE TREAD DATABASE HELPS INVESTIGATORS CATCH A KILLER

By Eric Chouinard, Contributing writer

When local Belleville, Ontario resident Jessica Lloyd went missing on Jan. 29, 2010, Belleville Police Service investigators discovered suspicious tire tread tracks that had been preserved in the late winter snow outside of her home.

After photographing the potential evidence, they sent the images to RCMP's Canadian Police Service Identification Centre (CPSIC), which provides police investigators across Canada front-line services, including urgent fingerprint identification, footwear identification and tire tread impression analysis.

Using its tire tread identification database, which contains images of virtually every make and model of vehicle tire, from cars and trucks to industrial vehicles and all-terrain vehicles, CPSIC analysts in Ottawa were able to determine the make and model of tire associated with the tire tracks — all within 24 hours.

To identify a tire tread from an image, a trained analyst looks for pattern sets of grooves and ribs on the images sent to the centre. After breaking the tire into a series of identifiable components, analysts then look for a match among the tire tread patterns in the databank.

"We're available around the clock to make sure investigators get the urgent analysis and information they need when time is of the essence, regardless of where they are in Canada," says Chris Read, a CPSIC analyst who assisted Belleville Police in the investigation.

MAKING THE CONNECTION

After learning the make and model of the suspect's tire treads, the Ontario Provincial Police (OPP) and Belleville Police Service set up roadside canvassing on Feb. 4, exactly one week after Ms. Lloyd had disappeared.

During the roadside canvassing, former Colonel Russell Williams was flagged by officers who noticed the tires on his Nissan Pathfinder matched those identified by CPSIC.

The investigation and subsequent confession obtained by an OPP investigator found Williams responsible for murdering both Lloyd and another woman, Cpl Marie-France Comeau.

"Our team finds it extremely rewarding when we're able to assist investigators to solve a crime," says Read.

And although Det Insp. Chris Nicholas, of the OPP's Criminal Investigation Branch, credits the success of the multi-jurisdictional investigation to the dedication of police officers, skilled interviewers and investigators, excellent training and good old-fashioned police work, he says the work of Read and his team was instrumental.

"The RCMP Canadian Police Service Identification Centre played a critical role in the Williams investigation by helping us identify the suspect vehicle," says Nicholas.

DATABASE ORIGINS

While the tire tread identification database allowed CPSIC analysts in Ottawa to assist Belleville and Ontario police, the system itself was independently created by an RCMP investigator, who is also a fingerprint, footprint and tire tread identification expert in Whitehorse, Yukon.

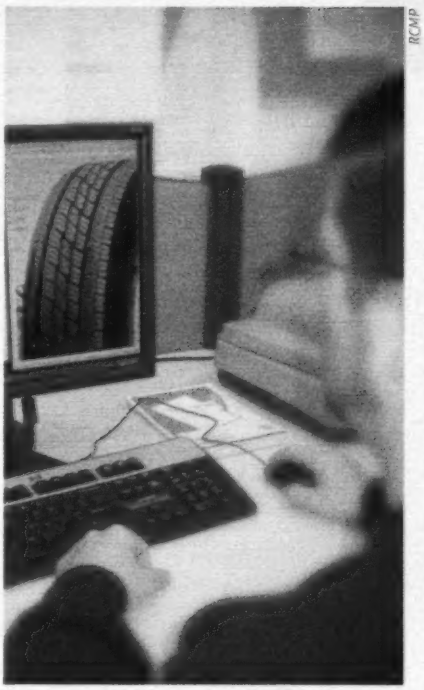
Cpl James Giczi began the database in 2007 while investigating a local home invasion where latent tire treads were found at the scene. Giczi noticed that the database in use at the time was unreliable — so he decided to create his own.

He visited local dealerships in the Whitehorse area to obtain tire brochures and began building his database, scanning and organizing the images. The result was a more effective tool for comparing and identifying tire treads.

Using the database, he was able to match the latent tire treads from the home invasion, leading to charges against two individuals.

Since its inception, the database — now the main source for tire tread identifications done by CPSIC analysts — has grown to more than 1,200 tire tread images from approximately 300.

Giczi regularly updates the system with new images after getting the latest tire brochures from car dealerships whenever he's out of town on business or vacation.



RCMP

Chris Read and other CPSIC analysts used the centre's tire tread database to determine the make and model of tires associated with tracks found outside Jessica Lloyd's home.

With the Williams investigation, Giczi's database has received significant media attention. But he's quick to point out that his work is just one part of a much larger team effort.

"The work done by CPSIC and all the investigators in this case was phenomenal," he says. "I'm just happy to be one of the cogs in the wheel of their investigation."

Getting the newest tire brochures lately is a little easier because many dealerships and manufacturers send Giczi a steady stream of the latest brochures, keeping his spare time at the office busy with a large stack of images to scan.

"I'm very proud of the work I've been able to accomplish since I started this project," says Giczi. "My father, a retired RCMP member, had heard about the role I was able to play in the capture of Williams and called to congratulate me — that's all the reward that a guy needs."

CAN FORENSIC SCIENCE BE OBJECTIVE?

THE PANELLISTS

Alain Cassista, forensic chemist, Royal Canadian Mounted Police
Dr. Itiel Dror, cognitive neuroscientist, University College London
Lesley Hammer, chair, Scientific Working Group on Shoe Print and Tire Tread Evidence

Critics of forensic science claim that scientists will always be subject to various biases, which will affect their work. But members of the forensic science community claim that they are aware of sources of bias, and that awareness of it can mitigate its effects. Discuss.

ALAIN CASSISTA

Forensic science encompasses several areas of analysis and examinations where conclusions can be based on both subjective and objective results and observations.

When discussing bias in forensic science we seem to always drift towards the areas of document and firearms examinations because their conclusions are often based on observations from microscopic examinations.

I will instead discuss the area of forensic chemistry and how it can be vulnerable to bias, in particular when comparing synthetic mass produced materials with the objective of determining common origin.

When conducting a comparison of fibres, paint, glass or other non-biological trace evidence with the objective of placing a person or object at a scene, it is important that forensic chemists not only report a result but also provide an interpretation of the result.

As chemists we have the skills and knowledge of conducting a wide variety of examinations and analysis and the danger is to use this knowledge to unintentionally mislead the court by not providing the appropriate value of the examination or analysis. It is very easy to say that two fibres are indistinguishable but if these two fibres are white cotton fibres, this result has very low value.

This may be simplistic but it demonstrates the point. In the absence of information describing the evidential value of a comparison, we are leaving this to the crown prosecutor, defence counsel, jury or judge.

By omitting this information or not ensuring it is provided, we are basically introducing a bias by possibly allowing the introduction of low evidential value results in court that may be given higher value or, conversely, not ensuring that results of high evidential value are given the appropriate value.

Information about the uniqueness or commonness of the materials compared needs to be present as well as the source of this information. Validated databases are excellent sources that can be used to provide this type of information; however, there are other sources and as long as they are validated and current, they are acceptable.

THE FACT THAT MANY FORENSIC SCIENCE DOMAINS ARE SUBJECTIVE DOES NOT MEAN THEY ARE NOT IMPORTANT IN FIGHTING CRIME

In the absence of knowledge about the materials being compared, the comparison should probably not be conducted unless it is clearly stated the value of the results of the comparison is unknown.

It is our responsibility to educate law enforcement agencies and crown prosecutors that, just because we can conduct a forensic examination, it may not have a lot of value without the ability to clearly convey the value of the results of the examination or comparison.

It is definitely possible for forensic science and, in particular, forensic chemistry to remain objective as long as scientists ensure that they provide the required information that will clearly communicate the value of the results.

DR. ITIEL DROR

While some domains of forensic science are quite objective, others are more subjective. For example, a whole host of impression and pattern evidence, such as tire marks, document examination, bite marks, and even fingerprints and firearms, rely on subjective judgment and interpretation.

In such forensic domains, it is the human examiner who is the main instrument of analysis, often having to determine if two patterns are sufficiently similar to conclude that they originate from the same source. Because there are no objective measures and tools for determining what constitutes such sufficient similarity, it is up to the human examiner to make these subjective decisions.

The fact that many forensic science domains are subjective does not mean they are not useful and important in fighting crime, both as investigative tools and in court. However, it does mean that they are vulnerable to a variety of contextual influences and biases.

These vulnerabilities can and should be addressed through, for example, cognitive and bias training. But to address these issues, one must first acknowledge their existence and understand their cognitive underpinning.

Cognitive scientists and psychologists have repeatedly and consistently observed contextual bias. Research has also demonstrated their specific existence in forensic science, where the same examiner has been shown to reach different conclusions when the very same evidence was presented within different extraneous biasing contexts. Subjectivity and contextual biases are recognized and accepted in many scientific fields that require judgment and interpretation.

Although there still remains some resistance and denial, much of the forensic science community has started to take promising steps in recognizing and acknowledging contextual bias. However, there are a few basic misconceptions of what bias is, and how best to address and minimize it. This is not surprising, given that forensic scientists are not experts in human cognition with a deep understanding of cognitive architecture and bias.

For example, often the issues of bias and contextual influence are incorrectly seen as ethical issues, or as issues that can be solved by mere awareness of the problem. However, the cognitive process of developing an expertise inherently entails vulnerabilities such as tunnel vision, lack of flexibility,

selective attention and bias.

Therefore, bias is a result of computational trade-offs carried out in the brain, not an intentional act that one consciously takes or can switch off at will. Therefore, being superficially aware of these influences by itself has little impact — if any — on how the context affects perception and judgment.

Bias has for the most part been misunderstood by forensic and law enforcement, and therefore encountered naïve and non-scientific views that it is an ethical issue that can be overcome by mere awareness.

The forensic and policing communities can benefit a great deal by properly addressing cognitive issues, such as bias. Much of the work in law enforcement depends on judgment and decision making, areas that cognitive scientists know much about, and who can offer remedies to fight bias and enhance cognitive effectiveness so as to increase the quality of decision making.

LESLEY HAMMER

Forensic practitioners are highly trained professionals committed to finding the truth.

For our purposes, "truth" is reporting the appropriate meaning and association of evidence that we are charged to examine. Part of our training, and certainly our intention, is to analyze only relevant facts, not allowing extraneous information to distract from the specifics of the physical evidence before us.

In addition to our professional commitment to the truth, we are under pressure to not make mistakes. Therefore, it is understandably threatening to be accused of having bias affect our examinations.

Bias is well documented, accepted and researched in cognitive psychology circles. As far as bias in forensic work, we know that contextual bias can contribute to a forensic misinterpretation of evidence. Additionally, further research has also demonstrated that examiners may change interpretations of previously examined evidence when influenced by contextual information.

Bias exists, and it is a part of us. There is no scientific or professional support for a position that denies its existence. Recognition of our own biases is a step in the right direction, as is gaining a science-based understanding of the role of bias in our work.

This can be accomplished through mutual support and interaction with the research community. They cannot properly study what we do without our involvement, and we do not have the time or resources to conduct this research on our own.

One extreme position in reaction to bias is that forensic work, such as comparisons, should be carried out in a complete vacuum. This is not practical, and would in some cases hinder the proper interpretation of evidence.

For example, footwear and latent print examiners need to have contextual information such as photographic methods used in collection to properly interpret artifacts that may be present.

Conversely, knowing that the impression was previously identified by a world-renowned expert is not information necessary to the examination.

Both practitioners and researchers are going to have to work together, educate one another and cooperate to conduct viable research. It will also take continued communication and work with policy-setting entities to ensure that changes to methods are applicable, viable and will result in the expected assurance of our work product.

As dedicated practitioners, we deserve to have faith and confidence in our work as conducted. Moving forward scientifically to examine and understand the nature of what we do and our own role in it will bring increased understanding and stakeholder confidence that the most accurate scientific truth is reported.

While some domains of forensic science are quite objective, others are more subjective. For example, a whole host of impression and pattern evidence, such as firearms, rely on subjective judgment and interpretation.

RCMP

BATTLEFIELD FORENSICS

COUNTERING IMPROVISED EXPLOSIVE DEVICES IN AFGHANISTAN

By LCol D.W. Corbett and Lt(N) K.P. McNamara, Canadian Forces Counter IED Task Force, Ottawa

In a quiet corner of the lab, a graduate of the Canadian Police College Forensic Identification Services course is carefully processing material collected from a crime scene. After what seems like hours, the technician recovers a critical piece of information, successfully attributing it to a known bomb maker.

On the other side of the lab, another technician processes a component from an improvised explosive device (IED) and learns exactly how it operates. Elsewhere, an explosives technician is x-raying IED components to determine how the device functioned.

Far from being your typical forensics lab, these are daily activities in the Canadian Forces' (CF) Level 2 exploitation lab in Afghanistan. More significantly, the technicians are not police officers, but rather members of the CF.

The exploitation lab is a military facility that permits rapid technical examination of something new, modified or unexpected within the area of operations. The item or information is initially exploited to determine if it represents an advantage for the enemy or a technical surprise for friendly forces.

If it does, the information or item then undergoes increasing levels of analysis until a countermeasure is developed and the technological advantage is neutralized. While a single weapon or technology seldom means the difference between final victory and defeat, it can give one side a battlefield advantage.

The CF has developed many new capabilities in the near decade of the Afghanistan conflict. One of the most significant is battlefield forensics, which permits our military members to link insurgents to specific events and remove them from the battlefield. In addition, the information gleaned enhances our ability to protect ourselves, our coalition allies and the Afghan population.

A Canadian counter-IED team disposes of captured insurgent explosive devices near Kandahar airfield.

Canadian Forces Combat Camera

A NEW CAPABILITY

Developing a new capability is not easy. Four years ago, forensics would not have been considered a combat enabler. In fact, from 2002 through 2006, evidence from roadside bombings and recovered material was simply ignored.

Then, in late 2006, the CF responded to a request for assistance from the United States and assigned a navy clearance diving officer to add his explosive ordnance disposal skills to the American Level 2 exploitation lab in Afghanistan.

Soon, the CF was employing small field exploitation teams, known as Level 1 exploitation teams, to examine the tactical situation of an event, such as why the enemy selected a particular location to initiate an attack, and to collect evidence for examination in the American labs.

To professionalize the capability, the CF, with the help of the Technical Operations branch of the Royal Canadian Mounted Police, began training bomb technicians in detailed post-blast examination techniques and in processing material to the same evidentiary standards expected of a peace officer in the Canadian judicial system.

Because much of the material submitted for exploitation was processed in the U.S. or the United Kingdom, the CF might not have learned of crucial information for months — often far too late to take action.

To resolve this, the CF established in April 2009 a temporary Level 2 forensic facility at Kandahar, known as the Multi Disciplinary Exploitation Capability (MDEC). A Level 2 facility is intended to conduct non-destructive forensic technical exploitation in a rapid manner so as to be relevant to the tactical commander. Turn-around times soon went from months to days, or occasionally hours for sensitive cases.

Manned by eight CF personnel, the MDEC includes the capability to:

- Conduct technical analysis of IED

components;

- Detect and conduct limited analysis of Chemical, Biological, Radiological and Nuclear agents;
- Maintain a database of exploited material that can be shared with partners and allies if required;
- Process captured enemy equipment and documents, including translation of documents and wet-film processing;
- Conduct limited site exploitation when appropriately supported;
- Provide technical assistance reach-back from specialists resident in Canada for Level 1 exploitation teams and facilitate the Level 3 exploitation process in Canada; and
- Maintain and construct realistic current-threat training aids for personnel about to deploy and professional development training of counter-IED personnel.

Information gained from the exploitation process is shared, to the greatest extent possible, with coalition partners and the Afghanistan government. It is also returned to Canada for use in training as well as for the benefit of government partners such as the RCMP, Public Safety Canada and Natural Resources Canada, among others. This cross-agency sharing is essential for the preparation of both field teams and lab personnel.

THE EXPLOITATION PROCESS

A CF field exploitation team faces challenges significantly different than what a public safety officer in Canada would. Time on scene may be as few as 10 minutes, while wearing full protective body armour in temperatures exceeding 50 C — and often under fire from the person who has committed the criminal act.

While the field teams are trained to operate to RCMP standards, the sites and circumstances they face are unlike that of a typical Canadian crime scene.

The teams must be able to quickly determine what evidence is critical and recover it immediately should a change in the tactical situation demand that the site be abandoned. Despite the hazard, the teams deal with the IEDs and collect the evidence necessary to support the fight. Evidence is photographed in-situ before being recovered and a chain of evidence is established.

By understanding both the RCMP standards and what may not be used because of the tactical situation, the material may subsequently be used for intelligence or prosecutorial proceedings by the judicial system of the Government of the Islamic Republic of Afghanistan (GIRoA).

Once recovered to a forward operating base, the material is confirmed to be physically, explosively and chemically safe for processing at the Level 2 lab. Material is re-photographed and a technical report prepared.

The submission is then prepared for shipment to Kandahar, where th material is again triaged to confirm safety and to establish processing priority.

While all evidence must be processed within 28 days, critical events, such as those related to a fatality, will be processed within hours. Normally, exploitation at the Canadian facility will be non-destructive to permit further exploitation.

The volume of material is staggering. From the date of its stand-up in April 2009 to the end of that year, the MDEC processed more than 500 cases. In 2010, that number was well exceeded.

As soon as possible, the results are passed to the troops on the ground and shared with allies. The material is either held at Kandahar for release to the GIRoA, destroyed, or sent to Canada.

In Canada, the material is delivered to one of the government Level 3 exploitation partners for more detailed exploitation. Level 3 involves scientific exploitation and is conducted in national laboratories.

Unlike our U.S. and U.K. allies, Canada employs a virtual Level 3 lab, which involves nearly a dozen different agencies and departments with capabilities distributed across the country. Their efforts are co-ordinated through an office in National Defence Headquarters in Ottawa.

These exploitation efforts often result in the material being replicated to determine the potential impact on CF equipment or personnel, or it may be reverse engineered to determine the source of the components. The results are shared with CF troops and coalition partners.

THE FUTURE

Today, CF members are employing police-standard forensic practices that were completely unknown to them four years ago. But the road to achieve this new capability has not been without sacrifice.

To date, five Canadian exploitation team members have been killed in the line of duty: Warrant Officer Dennis Brown, Cpl Dany Fortin, Cpl Chad O'Quinn, Cpl Martin Dubé, and Petty Officer Craig Blake. Many others have been wounded.

But this type of work is here to stay. The MDEC, established as a temporary facility, will soon be replaced by a containerized deployable technical analysis laboratory. Moreover, the Government of Canada acknowledges the IED threat will continue to exist for at least the next 20 years.

It is only through a continued cooperation with partners, such as the RCMP, the Canadian Explosive Technicians Association and others, that the CF will be able to maintain the highest standards in readiness for future operations abroad, and in support of the Canada First Defence Strategy, the modernization plan for the CF.

LEVELS OF EXPLOITATION

Level 1 – Field Exploitation
Captures the incident context (scene and events) and preserves, recovers and identifies physical artifacts.

Level 2 – Technical Exploitation
Involves the detailed examination of physical artifacts, to confirm device make-up, design, methods of operation, capabilities, similarities to other devices, recover latent biometric material and support network analysis. There is some overlap between Level 2 and Level 3 exploitation although the Level 2 work will be intrusive but non-destructive whenever possible.

Level 3 – Scientific Exploitation
Conducted in national laboratories to confirm Level 2 technical findings and uses deeper procedures to extract as much information on submitted material as possible. The information is then disseminated to support the exploitation effort.

GETTING TO THE TRUTH

COMPARING THE PEACE AND REID MODELS OF FORENSIC INTERVIEWING

By S/Sgt Scott McLeod, Polygraph Training, Canadian Police College

The term forensic interviewing is used in the police universe to describe a very structured and detailed interview process, used to obtain as much factual information about a criminal event as possible from witnesses, victims and suspects.

Emphasis is placed on determining the accuracy and veracity of the information as well as techniques to draw out forgotten details. This type of criminal interview enables the assessment of information and provides safeguards for potential false confessions.

An article in the April 2010 Canadian Journal of Criminology and Criminal Justice suggested that the PEACE model of interviewing would be the desired way to investigate criminal behavior versus the more standard Reid technique.

Several police agencies in Canada are now either teaching the PEACE model exclusively or are looking at the concept.

The Canadian Police College in Ottawa receives numerous inquiries about the two methods.

Before critical decisions are made, it is important to explore both models and the optimum would be to glean the best from both, as well as any other methods or techniques available.

PEACE MODEL

Introduced in Britain in 1984, this model set guidelines for interviewing witnesses and suspects. PEACE is an acronym for: Preparation and Planning, Engage and Explain, Account, Closure, Evaluate.

Preparation and Planning: Interviewers are taught to properly prepare and plan for the interview and formulate aims and objectives.

Engage and Explain: Rapport is established with the subject, and officers engage the person in conversation.

Account: Officers are taught two methods of eliciting an account from the interviewee:

- Cognitive Interview: used with co-operative suspects and witnesses.
- Conversation Management: recommended when co-operation is insufficient for the cognitive interview techniques to work.

Closure: The officer summarizes the main points from the interview and provides the suspect with the opportunity to correct or add information.

Evaluate: Once the interview is finished, the information gathered must be evaluated in the context of its impact on the investigation.

As can be seen, this model represents a non-accusatory approach to acquiring information about the person's honesty and

A forensic interviewing training scenario at the Canadian Police College, whose Forensic Interviewing Course and Polygraph Examiners Course teach a hybrid version of both the PEACE and Reid model interviewing techniques.

Canadian Police College

involvement. This would definitely work well in the case of co-operating witnesses or suspects.

Arguably, there is not an included portion that would allow for the investigator to persuade a reluctant or non-co-operating witness or suspect to tell the truth about the incident. It therefore can be argued that the model severely limits the investigator's ability to solve cases.

It must be noted that in the United Kingdom, the 1984 *Police and Criminal Evidence Act* stipulates that a suspect can be told that if he does not give an account to police, then his silence will be used against him in court. The judge must advise the jury that they can consider the suspects silence in deliberations.

According to Sentencing Guidelines Council for England and Wales, the police in the UK can also advise a suspect that if he agrees to a guilty plea, he will receive one-third off of the sentence.

These are two huge factors that cannot be presented to suspects in Canada — the threat of using his silence against him and a promise of reduced sentence if he co-operates. The possibility of obtaining a false confession by a person influenced by either of these rules is always present.

REID MODEL

The Reid Technique, developed by American lawyer John E. Reid, is a three-part process for solving a crime. The first step is referred to as factual analysis. This represents the collection and analysis of information relative to a crime scene, the victim and possible subjects.

This is the equivalent of the Preparation and Planning stage of the PEACE model.

The second stage of the process is the interview of possible subjects. This structured interview is a non-accusatory question and answer session intended to elicit information from the subject. This allows for the obtaining of background information and rapport building.

This would be the equivalent of the Engage and Explain component of PEACE.

An additional component to the Reid model is that during this stage, it also provides the opportunity to evaluate and note the suspect's 'normative' behavior for eye contact, response timing, spontaneity and general nervous tension. It also provides the opportunity to assess the suspect's intelligence, communication skills, mental health and general suitability for the interview — all the ingredients that need to be addressed for the *voir dire*, the court hearing to determine the admissibility of evidence or the competency of a witness.

During the remainder of the interview, the suspect is asked investigative questions, which would be the equivalent of the Account and Closure components for PEACE but goes further in the asking of behavior-provoking questions. This is all done in a non-accusatory manner that will provide confidence to the investigator.

If the investigator believes that the subject has not told the truth during the non-accusatory interview, the third part of the technique is employed, which is the accusatory interrogation. This would also hold true in the PEACE mode, however, there are no interrogation structures in place with the PEACE model other than appealing to the suspects attributes.

The purpose for interrogation is to elicit the truth from someone whom the investigator believes has lied during an interview.

CONFESSIONS

A relevant passage from *R. v. Rennie* illustrates excellent insight into the criminal mind and the usefulness of the Reid Technique: "Very few confessions are inspired solely by remorse. Often the motives of an accused are mixed and include a hope that an early admission may lead to an earlier release or a lighter sentence."

The Reid Technique deals with nine steps to interrogation and all have been upheld by the Supreme Court of Canada. The investigators' bible often cited is *R. v. Oickle* (2000), which reinforced a police interrogator's ability to use the Reid Technique's non-accusatory approach, or what the court called "a gentle, reassuring manner," to gain an interviewee's trust and secure a confession or admission. The Court of Appeals had previously rendered the elicited confession in the case inadmissible.

There have been several challenges over the years and the most important concern of any interrogation technique is the possibility of false confessions. All agree that there is no room for this error.

The courts have set guidelines to ensure there are safeguards in place when they consider the admissibility of a confession. They are primarily based on voluntariness, which consists of looking at oppression (basic human needs), promises or threats (including veiled threats and inducements), operating mind (the person knows that there is a consequence) and trickery (does not shock the community).

During the Canadian Police College's Forensic Interviewing Course and its Polygraph Examiners Course, we have adapted a hybrid version of both these interviewing techniques as well as researched topics not covered here.

To address the above concerns identified by the courts we have formatted our structured processes and included a session on false confessions so investigators have the knowledge of how far to go. We continue to monitor new relevant case law and research that will have an impact on how we interview.

Regardless of the particular technique chosen by an agency to fulfill their forensic interview requirements, the key is to have a structure in place that has been shown by research and experience to accurately and reliably produce the factual results.

POLYGRAPH

The forensic polygraph test would be the next and final step to arrive at the truth. The polygraph procedure utilizes the same structured forensic interview, in conjunction with physiology, to allow the examiner to come to the proper opinion as to whether deception or no deception has been indicated. However, polygraph testing in Canada is not used as often as it should be by investigators.

And while the results of a polygraph test are not admissible in Canadian law, any conversations that result after a polygraph test can be admitted, subject to a *voir dire*. In fact, CPC-trained examiners typically are successful in having statements after a polygraph test admitted. Therefore, no file should be concluded without first having considered whether the polygraph could help.

CONCLUSION

As with any police tool, the way forensic interviewing is applied and how it is articulated in court proceedings will dictate whether the courts will continue to support our techniques. We have enjoyed great success in Supreme Court rulings and must take it upon ourselves to be guided by our professionalism and training to do the right thing.

BIG IMPRESSION

CELEBRATING 100 YEARS OF FINGERPRINT IDENTIFICATION IN CANADA

By Eric Chouinard, Contributing writer

This spring, the RCMP will be celebrating the 100th anniversary of the use of fingerprints to support criminal records in Canada. This role is now the responsibility of Canadian Criminal Real Time Identification Services (CCRTIS), whose mandate includes managing the National Repository of Criminal Records, conducting fingerprint-based background checks for civil screening and matching latent fingerprints — those obtained at crime scenes — to known criminals.

Since 1911, the process of fingerprint identification and the classification of national criminal records has evolved significantly, undergoing several transformations. CCRTIS currently processes thousands of fingerprint submissions daily to update criminal record files, process civil screening applications and update pardon files.

BEFORE FINGERPRINTS

The early beginnings of Canadian criminal record management date back to the late nineteenth century, when the Canadian government looked into forming a central bureau to maintain all national criminal record information.

At that time, there was no standardized method of identifying criminals in relation to their criminal records. And no uniform identification system existed as police services around the world each had their own methods.

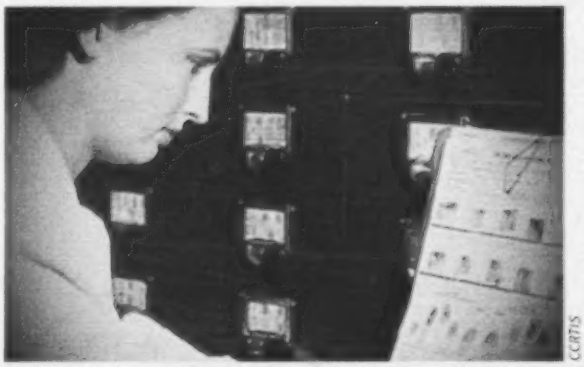
In 1898, Parliament proposed the adoption of the Bertillon system of identification as the Canadian standard. Used in France at the time, the system relied on a complex series of measurements of an adult body relative to its parts.

To centralize criminal records, police services across Canada would have used Bertillon's system to identify criminals and submit copies of the recorded information to a central bureau located in Ottawa, Ontario.

Since the Bertillon system was overly complex and beyond the expertise and budgets of many police departments at the time, it never took hold as the standardized identification method — paving the way for fingerprints.

STANDARDIZATION

Considered by many at the time to be an authority on fingerprint identification, Insp Edward Foster of the Dominion Police Service, Canada's federal police force at the time, championed the use of fingerprints for identification over the Bertillon system because their uniqueness could be used to better identify an individual.



CCRTIS

In the early days, fingerprint classification, archiving, searching and comparison was done entirely by hand.

He proposed that a trained examiner would be able to identify an individual using fingerprints since each pattern is unique to that individual. Foster demonstrated this empirical fact several times throughout his career during different cases.

Determining that fingerprints could be used to positively identify individuals created the basis for the criminal record and would avoid instances of mistaken identity. Thanks to Foster's efforts, and the support of what is now the Canadian Association of Chiefs of Police, Prime Minister Sir Wilfrid Laurier sanctioned the use of fingerprints as the Canadian standard in the *Identification of Criminals Act* in 1908.

In February 1911, the official Canadian Criminal Identification Bureau opened its first office in Langevin Block opposite the Parliament Buildings in Ottawa, Ontario under Insp. Foster's supervision.

At that point, the collection consisted of 2,042 fingerprint-based criminal records — in contrast to the approximately 4.2 million of these records that CCRTIS now holds.

Throughout 1911, police services across the country, including the Royal North West Mounted Police (RNWMP) divisions, Western Canada's police force, were provided with training on obtaining fingerprints, lifting fingerprints found at crime scenes and on tools of the trade such as ink, rollers and other materials.

Nine years later, the Dominion Police and the RNWMP merged, becoming the RCMP. By the 1950s, the identification bureau had moved to the RCMP Headquarters' Vanier Parkway campus in Ottawa, where it still resides today under the CCRTIS name.

EARLY TECHNIQUES

In the early days, fingerprint classification, archiving, searching and comparison was done entirely by hand. Similar to the way most libraries were organized using the Dewey Decimal system and sorted by a cross-referenced filing card system, fingerprints were organized by a system known as the Henry Classification method.

Developed in the late 1880s by Scotland Yard's Edward Henry, the Henry Classification grouped fingerprints according to pattern sets found on all ten fingerprint impressions. All ten fingerprint impressions were contained on a single card or form known as a tenprint card.

The prints were then classified according to their unique pattern sets and grouped with similarly patterned fingerprints from other individuals. A name-based index also existed to assist examiners with quick name-based searches of prints.

Using a name-based index, an examiner would first attempt to find an existing criminal record by the individual's name. Failing that, the examiner would then manually retrieve a group of tenprint cards that had similar patterns to the print under

analysis. Using a magnifying lens, the print would be verified by hand to the prints contained in the criminal record holdings.

Donald Harrison, a senior civilian fingerprint examiner with the RCMP for 41 years, says the early system was effective, but labour intensive.

"When I first arrived, I remember using the paper-based Henry system to find a print," says Harrison. "It's a great system but becomes impossible to maintain and search once your records increase to the millions we have today."

COMPUTERIZATION

One of the most significant changes to Canadian fingerprint records was the introduction of computers in 1970, which made it possible to store large libraries of image files on magnetic tape. More than 120 filing cabinets full of tenprint forms were condensed into 25 reels of two-inch magnetic tape on an Automated Fingerprint Identification System (AFIS) called Videofile.

The limitations of magnetic tape and its propensity to deteriorate led to the implementation of more sophisticated tools in subsequent years.

The AFIS system is an electronic filing system that digitally maps the characteristics of fingerprints, highlighting the flow and minutia contained on the ridges or pattern lines. These templates form the coordinates of the fingerprint that the computer uses to match to other prints.

The possible matches may be verified by a trained fingerprint examiner or possibly verified electronically if the quality of the fingerprints being searched and the fingerprints on the database are of a high enough quality.

In the late 1970s, AFIS significantly increased the identification of latent prints to 900 from 50 latent print identifications annually.

Throughout the next two decades, new systems yielded improved storage capabilities, shorter retrieval times and exponential increases in latent fingerprint identifications.

"Before the AFIS system, looking for latent prints using the Henry method was like looking for a needle in a haystack," says Mr. Harrison. "Today we make nearly 2,500 latent identifications per year thanks to systems that have allowed us to search all four million of our criminal records for matches to latent prints in mere seconds."

TODAY

As of 2007, the latest iteration of the AFIS system, part of the Real-Time Identification (RTID) project, removes the need for analysts to manually map out a fingerprint on a computer as the system is capable of recognizing the characteristics of a scanned print. In addition, police services across Canada that use compatible electronic fingerprint scanning systems receive search results much faster than ever before.

Currently, 21 police agencies in Canada have the ability to remotely search latent fingerprints against the central repository. The system has also provided cross-border electronic criminal searches with the Federal Bureau of Investigation in a matter of minutes.

RTID has also significantly reduced wait times for civil screening fingerprint requests. Where paper-based checks could take weeks or months, electronic submissions take minutes.

As the systems become more sophisticated, CCRTIS is able to provide additional information to investigators on many latent prints for cold cases, helping law enforcement track down criminals and provide closure to the families of victims.

CONCLUSION

Since the early days of Foster's Identification Bureau, new techniques, chemicals and light sources have significantly enhanced the ability of police services to locate and develop latent fingerprints and have greatly improved the quality of submissions.

"Celebrating the beginning of Canada's central identification bureau affords us a unique opportunity to reflect on the many ways in which Canadian criminal records have evolved over the last century," says Guylaine Dansereau, director general of CCRTIS. "Moving forward we hope to continue using the latest technologies to continue innovating and improving our services to law enforcement across Canada and throughout the world."

FINGERPRINT TECHNOLOGIES

1970 — **First generation AFIS System**
- Videofile tape storage system reduces the need for manual searching of cabinets containing tenprints

1978 — **Second-generation AFIS system**
- First time for computer-assisted latent fingerprint searches against a subset of the full collection from known repeat offenders
- Latent identifications soared to 900 from 50 annually

1985 — **Third-generation AFIS system**
- Storing of digital fingerprint images on optical discs for the first time
- Search times from one hour to less than one minute

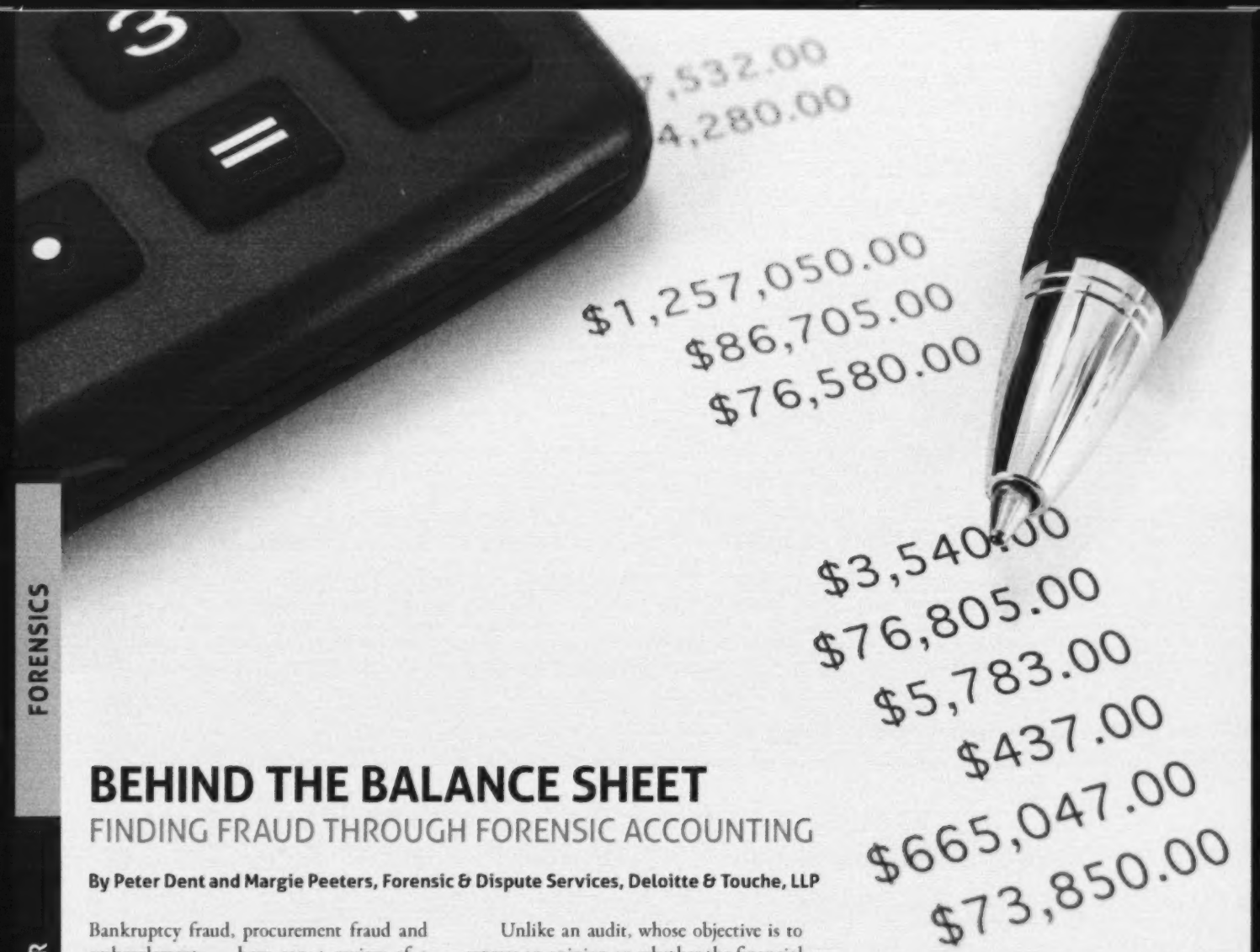
1990s — **Fourth-generation AFIS system**
- Complete re-scan of entire paper-based fingerprint master collection creates new high-resolution digital records
- Latent print identifications climb by another 20 per cent due to the introduction of new incoming fingerprints searches against the unidentified latent prints held, referred to as reverse latent searching

1998 — **Fifth-generation AFIS system**
- Advanced filtering system for tenprint and latent fingerprint searching
- Search time drops to a minute for both searches and allows retrieval of fingerprint images in seconds

1999 — **Separate collection for latent fingerprint searching eliminated, allowing these searches to be made against the entire fingerprint collection of four million records**

2007 — **Latest generation of AFIS system**

2011 — **Ongoing implementation of RTID technologies to police services across Canada**



BEHIND THE BALANCE SHEET

FINDING FRAUD THROUGH FORENSIC ACCOUNTING

By Peter Dent and Margie Peeters, Forensic & Dispute Services, Deloitte & Touche, LLP

Bankruptcy fraud, procurement fraud and embezzlement — how can a review of a company's financial information identify red flags of fraud? How do we get from red flags in the financial records to the actual evidence of whether there has been malfeasance?

There are two main components to an entity's financial statements: the balance sheet and the income statement. The balance sheet represents assets and liabilities and shareholder's equity represents the net worth of an entity at a point in time. The income statement represents its performance for a given period — its revenue, expenses and resulting profits.

While financial statements do not tell the whole story, a review of them by forensic accountants where there are allegations of fraud can ensure that red flags are identified and the underlying accounts are reviewed in depth. On a more basic level, a review of the financial statements and information obtained through statements and interviews taken by law enforcement may also corroborate initial allegations of fraud.

Unlike an audit, whose objective is to express an opinion on whether the financial statements are in accordance with the relevant basis of accounting, forensic accounting reports on the analysis of evidence and facts that may or may not support allegations of fraud or other financial abuse. Forensic accounting requires an investigative mindset when evaluating information that may be false, biased, unreliable, or incomplete in a much more detailed manner than that contemplated by an audit.

The following cases highlight the allegations of fraud, the red flags that were identified from a review of the company's financial information by forensic accountants, some of the forensic accounting steps taken to investigate the red flags and how the perpetrators were able to carry out the alleged frauds. In addition, the cases illustrate how effective an investigation can be when forensic accountants work with law enforcement.

Certain case facts have been altered to preserve confidentiality.

ALLEGED BANKRUPTCY FRAUD

A large corporation provided a multimillion-dollar loan to an international wholesale distributor. The borrower was able to continue to draw funds from the loan provided it maintained a certain level of accounts receivable — money owed by customers — and inventory. The lender began to have concerns when the borrower reported a large increase in accounts receivable and sales and continued to request more funds from the loan. Some of the processes undertaken by forensic accountants to assist in the investigation of the allegations included the following:

- a review of the accounts receivable to determine distinct patterns with

particular customers, such as multiple payments in the same time period;
- a review of the sales files, such as shipping documents indicating delivery and receipt of items, to determine if there was evidence that the sales existed;
- a review of the borrower's inventory records to assess whether the level of activity in the inventory accounts matched the level of sales and purchases reported;
- a review of the company's financial records (bank accounts and general ledger) to determine if cash was actually being collected from customers and to determine how the loan was being used.

It was determined that the perpetrators issued new or updated invoices to customers. In many cases, they used the same invoice numbers but with dates 90 days later than the initial invoice. Fictitious sales were recorded at the original sale amount plus an additional inflated amount. The purpose was to create the appearance that the accounts receivable were current and in order to draw more funds from the loan.

A review of inventory records found what is commonly referred to as the thin file syndrome, where there are few, if any, supporting documents for a specific transaction.

In several cases, there were no documents such as shipping and import documents to indicate that inventory was received. And there was no proof of payment that inventory was actually purchased. In the end, both the inventory and the sales did not exist.

While tracing the fictitious transactions, it was discovered that to give the appearance that cash was being received, cash was being transferred to accounts owned by the borrower in other countries. In reality, just as there was no inventory purchased or sold, there was no cash flow to third parties either.

The matter was referred to law enforcement. Working in conjunction with the forensic accountants, the police continued the investigation, taking statements of those working in the finance department and interviewing senior management.

Through the course of the investigation the forensic accountants and police found that senior management of the borrower had bled out the company through excessive salaries, bonuses and extravagant expenses with the use of the lender's money leading to the borrower defaulting on their loan.

ALLEGED PROCUREMENT FRAUD

A large corporation discovered a high volume of expenses recorded into an account that normally had minimal activity. The corporation determined that the expenses related to an unfamiliar supplier. They were concerned that they may have been a victim of procurement fraud and called the police. The police in turn requested the assistance of forensic accountants to assist in the review of the financial records. Some of the initial steps undertaken to investigate the allegations included the following:

FINANCIAL STATEMENTS DO NOT TELL THE WHOLE STORY, BUT A REVIEW OF THEM BY FORENSIC ACCOUNTANTS CAN ENSURE THAT RED FLAGS ARE IDENTIFIED

- a review of all invoices issued by the supplier to note anything unusual, such as duplicate invoices;
- background research on the supplier to identify who owned the company and the nature of its purported business activity;
- a review of the email account of one of the corporation's employees to determine if there was any correspondence with or regarding this supplier and the owner of the supply company.

The invoices had various red flags, including that all of them were approved by the same employee and each of the amounts were under the approval limit of the employee, ensuring no further approval was required. The invoices were generally sequentially numbered suggesting that the supplier potentially had only one customer.

Some of the emails reviewed indicated that the employee had a close relationship with the owner of the supply company and police attempted to contact the supplier but were unsuccessful. Using the financial analysis of the forensic accountants and the emails obtained from the suspect employee's computer, the police obtained a search warrant for the bank statements, deposit information and cheques associated with the supplier's account. With these, the forensic accountants identified all payments made to the supplier and reviewed the supplier's bank account information.

A review of the bank account information obtained revealed that the main source of funds into the bank account was from the corporation and no other customers.

The majority of the funds coming out of the account related to items of a personal nature and also included payments to the employee of the corporation.

Armed with the work of the forensic accountants the police interviewed the suspect employee.

It was discovered that knowing his approval limit, the suspect employee was able to steal the funds through collusion with the fictitious supplier, both taking advantage of the fact that the company was used to dealing with paying for large volumes of services.

The corporation paid for services that were never rendered and at the end of the investigation, several fictitious suppliers were identified that were associated with the close friend of the employee. The evidence gathered by both the forensic accountants and police was used as the basis to lay criminal charges.

CONCLUSION

These cases illustrate that where fraud exists, evidence exists in some part of the financial statements. As fraud is not a normal business activity, it impacts the financial statements in ways that stand out from the expected and forensic accountants are trained to look for such anomalies pointing to specific financial statement accounts. A more detailed analysis of the affected accounts, that appear to deviate from the expected, may lead to a faster determination of the existence of fraud.

With more than 16 years of experience investigating and providing expert testimony regarding allegations of fraud and corruption, Peter Dent is a partner and the national practice leader of Forensic & Dispute Services at Deloitte & Touche. He is also a former York Regional Police constable.

Margie Peeters is a senior manager within Forensic & Dispute Services of Deloitte's financial advisory practice, specializing exclusively in forensic and investigative accounting since 2004.

GETTING THE DIRT

THE VALUE OF SOIL IN CRIMINAL INVESTIGATIONS

By Dr. Rob Fitzpatrick, Director, Centre for Australian Soil Science

Soil forensics is the science or study of soil that involves the application of a wide range of soil information to answer legal questions, problems or hypotheses.

For soil scientists, soil is made up of different sized mineral particles (including sand, silt, clay and organic matter) and has complex biological, chemical, physical, mineralogical and hydrological properties that are always changing over time.

But for farmers, gardeners and agronomists, soil is just a medium for growing crops, pastures and plants. And for engineers, soil is a material to build on and excavate.

Thus soils can be both naturally occurring, comprising natural minerals and organic materials, and man-made, such as those that often contain very small amounts of manufactured materials, including brick fragments, explosive residues or paint flecks.

It is this soil diversity and heterogeneity that has enabled forensic soil examiners to distinguish between soils that may appear to be similar to the untrained observer.

HISTORY

Soil forensics dates back more than 150 years. Arguably, the first documented case of a forensics comparison of soils took place in Berlin and was used to help police solve a crime that took place on a Prussian railroad in April 1856.

A barrel that had contained silver coins was found on arrival at its destination to have been emptied and refilled with sandy soil. Prof. Christian Gottfried Ehrenberg in Berlin acquired samples of the soil from all the stations along the line.

Using a light microscope, he examined features of the soil particles, such as colour and shapes, to compare the soil similarity in the barrel to the station from where the sand originated.

In October 1904, George Popp, a forensic scientist in Frankfurt, successfully examined soil, minerals and dust from clothes for identification to help solve a criminal case.

Between 1905 and 1990, soil information was used extensively by police. However, by that point, soil analysis became too specialized and expensive for in-house use in most Australian forensic laboratories and outside forensic agencies.

As a consequence, critical soil forensic evidence was often missed or ignored completely, hidden amongst trace evidence and insufficiently analyzed. And new techniques in soil science were not deployed on complex forensic cases.

TODAY

A double murder in 2000 helped bring forensic soil science back to the forefront. Soil scientists from the Australian Commonwealth Scientific Industrial Research Organization (CSIRO) used soil properties including colour as well as chemical, physical and mineralogical characteristics as well as soil maps and field investigations to solve the case.

Scientists identified similarities between soil found on a shovel taken from the suspect's vehicle and soil subsequently located in a gravel quarry. The identical samples were undeniable and later helped reveal the location of the two buried bodies.

This success led the Australian forensic community and CSIRO scientists to establish the Centre for Australian Forensic Soil Science (CAFSS) in 2003.

The centre is the first worldwide network of forensic and soil scientists to maintain a critical mass of expertise in soil forensics to help protect Australia from crime, terrorism and environmental pollution.

CAFSS expertise spans five disciplines: soil profiling (collection of samples from scenes of crime, soil descriptions and soil mapping), mineralogy (x-ray diffraction), chemistry, soil biology/molecular diagnostics (soil organics and soil DNA) and soil geophysics (electromagnetics and ground-penetrating radar).

The personnel in each discipline have specialized formal educations, training and experience in examining soils. Approximately AUD$5 million of analytical instrumentation allows CAFSS to provide a wide range of services.

To date, CAFSS has helped investigate more than 90 criminal and environmental forensic cases — including one involving the kidnapping and rape of a nine-year-old child.

Similarities between soil found on shoes from the suspect's house and samples from the crime scenes involved helped crack the case.

CAFSS was also crucial in solving the case of the illegal clearance and theft of AUD$11 million worth of tree ferns from national parks in Victoria, Australia.

Courtesy Dr. Rob Fitzpatrick

Australian soil scientists were able to identify similarities between soil found on a blood-stained shovel taken from a double-murder suspect's vehicle and soil located in a gravel quarry, where the bodies of the two victims were later found. The case helped cement the importance of soil science in criminal investigations in the country.

CRIMINAL INVESTIGATIONS

The aim of forensic soil analysis is to associate a soil sample taken from an item, such as shoes, clothing, shovel or vehicle, with a specific location.

To achieve this, the methods of analyses must be able to discriminate between soil samples from different locations. These methods must be standardized, inexpensive, accurate and applicable to small and large samples alike.

A developing area of soil forensics is its use in intelligence work. A person, for example, may claim to have never been to a particular location, but is then found with soils from that area, thus linking the individual to a geographic location.

CAFSS undertakes research and case work for the police — including the Australian Federal Police and state police departments — and forensic laboratories across the country.

Using state-of-the-art soil technology, CAFSS collects and analyzes soil evidence and disseminates their findings concerning suspects, witnesses, victims or crimes scences, which is critical to investigators.

CAFSS staff members are also regularly subpoenaed to testify in court. As a result, CAFSS is faced with responsibility as well as increased scrutiny and accountability.

In this regard, CAFSS has recently developed its Guidelines for Conducting Criminal and Environmental Soil Forensic Investigations. The guidelines are designed to provide a more systematic approach and use of appropriate standard methods for sampling, characterizing and examining soils for forensic comparisons.

They also assist CAFSS in its mission by ensuring efficiency and accountability in the proper handling, storage and tracking of soil evidence, which is essential to evidence collection and ultimate prosecution.

EVIDENTIARY VALUE

These days, soil forensics, as a newly developed discipline of soil science, has matured to the extent that well-defined questions and successful crime scene investigations are being addressed in increasingly refined ways.

In fact, five cases in Australia have been solved with no forensic work done because detectives have simply mentioned to the suspect or legal teams that soil samples have been or will be compared and investigated by forensic soil scientists.

Soil materials are powerful pieces of contact trace evidence, and may even be considered as approaching the ideal contact trace for six reasons:

1. Soil is highly individualistic in that there are thousands upon thousands of different soil types, enabling forensic examiners to distinguish between soil samples.
2. Soil has a strong capacity to transfer and stick especially the fine clay- and silt-size fractions.
3. Unlike the more obvious bright transfer colours of blood, lipstick smears and paint, soil is nearly invisible. Fine soil materials, especially when they impregnate vehicle carpeting, shoes or clothing, are often not visible to the naked eye; a suspect will often make little effort to remove them.
4. Soil materials are easily located and collected using hand lenses or light microscopes when inspecting crime scenes or examining items of physical evidence.
5. Soil materials are easily described and characterized by colour and by using various analytical methods such as x-ray diffraction (mineralogy) and spectroscopy (chemistry).
6. In Australia, a national computerized database of soil profile data and maps can be readily produced by police or soil scientists by downloading information directly from the Internet via the Australian Soil Resources Information System database.

FUTURE

The type of soil information used to help police in forensic investigations may involve the application of accurate soil descriptions of colour, soil maps, soil minerals, soil biology (plant roots), soil chemical and physical properties, such as pH level or soil magnetism.

The challenges of associating small amounts of soil information from one source with that from another will require new sophisticated laboratory methods, such as the analysis method created by CAFSS staff to characterize extremely small soil particles.

However, more holistic approaches are currently being adopted by also using inseparably linked forensic disciplines, including forensic geology, forensic archaeology and environmental forensics.

Dr. Rob Fitzpatrick is a certified professional soil scientist, a Professorial Fellow at Flinders University (School of Chemistry and Physical Sciences) and an associate professor within the School of Earth and Environmental Sciences at the University of Adelaide, Australia.

FOR MORE INFORMATION, VISIT:
WWW.CLW.CSIRO.AU/CFASS/

WHAT MAKES A GOOD CRIME SCENE OFFICER?

STUDY IDENTIFIES SEVEN KEY SKILLS

By Dr. Sally Kelty and Associate Professor Roberta Julian, Tasmanian Institute of Law Enforcement Studies, University of Tasmania, Australia

The following article is an overview of the preliminary findings of "The Effectiveness of Forensic Science in the Criminal Justice System," a project funded by the Australian Research Council (LP0882797). This five-year investigation aims to identify when, where and how forensic services can add value to police investigations, court trials and justice outcomes while ensuring the efficient use of available resources.

The crime scene is considered to be one of the most crucial aspects of an investigation. The scene of the crime is where good forensic science begins.

High-quality and useful evidence leading to accurate and fair criminal justice outcomes can only occur if the scene is processed effectively and professionally (Robertson, 2009).

If photographing, documenting, and collecting the right samples/traces from a crime scene is so vital, what are the skills and attributes you need to be effective? Who makes a good crime scene examiner/officer (CSE/O) is one of the questions we have started to explore in our project, The Effectiveness of Forensic Science in the Criminal Justice System.

Courtesy Australian Federal Police

Australian research has identified seven key skills that high-performing crime scene officers should possess.

CURRENT RESEARCH

Why we should care about the professionalism, skills and attributes of crime scene personnel was highlighted recently in two major reports.

The United Kingdom's Scientific Work Improvement Model Report (Adderley, Townsley & Bond, 2007) noted the serious problem of wide differences in the performance of British CSE/O at volume crime scenes.

This report found that the top 25 per cent of CSE/Os took significantly less time to arrive at scenes, they attended a lot more scenes each day, and they collected higher quality traces/evidence that were more likely to be useful in criminal investigations and lead to positive identifications of property offenders.

The 2009 National Academy of Sciences (NAS) report also noted that across the United States there have been large differences in the performance and accuracy of evidence collected by CSE/Os.

The NAS considered that many of the problems in evidence collection were not malicious in nature but were caused through honest mistakes resulting from too much haste at scenes and lack of experience and training.

Both the American and British reports highlighted that some CSE/Os clearly

outperform their peers in the quality of work, and this difference leads to more positive justice outcomes rather than unsolved cases.

IDENTIFYING KEY CSE/O SKILLS

However, what neither report could provide was an explanation of why some CSE/Os excel at crime scene investigation.

The aim of our work is to explore whether we can identify a clear critical skill set that can qualitatively describe why some CSE/Os stand out from their peers in the quality and precision of their work.

The rationale is that by identifying high performance critical skills in CSI there is the potential for increasing the effective use of forensic science in criminal cases. This has clear justice and economic implications.

INTERVIEWS WITH CSE/OS AND OTHERS

Through a series of in-depth interviews and job analytical techniques in four police jurisdictions across Australia we asked CSE/Os, senior police investigators, managers of CSE/Os and forensic science academics to identify the personality traits, education, cognitive attributes, professional and interpersonal skills of top performing crime scene personnel.

To date we have interviewed more than 45 men and women.

Our interviewees all had extensive experience of working with both high or average performing CSE/Os, such as senior homicide detectives, specialist CSE/O educators (forensic science academics), and senior police with direct CSE/Os managerial and supervisory responsibilities.

We used semi-structured questions as well as techniques that asked colleagues to describe why some people excel and how high performers impact upon other people in terms of demonstrated work ethic, ability to enthuse others, problem-solving, teamwork behaviour and communication.

We asked participants to consider the skills of the most competent and proficient people they work with and then to repeat this process for average and poorly performing CSE/Os.

PRELIMINARY FINDINGS

We analyzed the interviews and results using Smith's (1995) content analysis approach to identify the critical skills that colleagues had directly observed in their high performing CSE/Os peers. We then clustered the critical skills identified into distinct and meaningful skill categories. To date, we have identified seven skill set categories: knowledge base, experience, work orientation, approach to life, communication, professional demeanour and cognitive abilities.

KNOWLEDGE BASE

Our interviewees said that good CSE/Os have a holistic understanding of where CSI fits into the criminal justice process; they understand the legal aspects of evidence they collect; and they have a sound scientific knowledge that underpins their work.

EXPERIENCE

We were told about the importance of having life experience and managing difficult situations, such as talking to victim's children at a suicide scene, or attending the home of someone who has been deceased for weeks.

WORK ORIENTATION

We were told that good CSE/Os have great amounts of energy and are passionate in what they do.

APPROACH TO LIFE

Higher performing CSE/Os have a clear work -life separation, have a busy and active out-of-work life, and have good family/friend support.

COMMUNICATION SKILLS

Our interviewees stressed that good CSE/Os are good communicators and can "talk to anyone," not just performing well as expert witnesses in court.

PROFESSIONAL DEMEANOUR

Good CSE/Os are known of as positive people, who rarely complain and act in a professional manner doing their work to the best of their ability.

COGNITIVE ABILITIES

We were told that one difference between good and average CSE/Os was their ability to think on their feet, to respond quickly when things changed at the scene and to make reasoned rather than rash decisions.

CONCLUSION

In this brief paper we have overviewed the preliminary results from our investigation into the skills and attributes of high performing crime scene personnel. We plan to finish our interviews and publish our findings in 2011.

Future directions for our work include discussing the potential implications of our work for police and law enforcement HR policies. For example, how do crime scene personnel develop and maintain this critical skill set?

A related issue is whether crime scene personnel, who already have some of these skills, or the potential to develop these skills, can be recruited.

The next step in our work is to develop a pilot recruitment strategy.

This article was based on the keynote presentation "Who makes a good crime scene examiner?" given at the 20th International Symposium on the Forensic Sciences in Sydney, Australia in September 2010.

FOR MORE INFORMATION, VISIT: WWW.UTAS.EDU.AU/TILES/

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TAKING A BITE OUT OF CRIME

HOW FORENSIC DENTISTRY CAN HELP POLICE CLOSE THE CASE

Evidence from bone fragments and teeth is often crucial in cases that are difficult to crack. That's when Canadian police turn to forensic dentistry expert Dr. David Sweet O.C., chief forensic odontologist for British Columbia and a consultant for the RCMP. The Gazette's Richard Vieira talks with Sweet about the services he and his Bureau of Legal Dentistry (BOLD) lab at the University of British Columbia provide police, the techniques they've developed and the challenges they face.

WHAT IS YOUR ROLE AS A CONSULTANT TO THE RCMP?

It all depends on the request for assistance, but the BOLD lab and I act as a clearinghouse for referrals.

We're essentially a go-to resource that links police with experts that can help with a particular case. But we also perform analysis ourselves on a case-by-case, fee-for-service basis.

WHAT SERVICES DO YOU AND THE BOLD LAB OFFER?

We perform several functions, one of which involves the identification of both deceased and living individuals, such as missing people, using dental records.

While we do this for many criminal cases, we've also done this for disaster victim identification (DVI) after the 2004 tsunami in Thailand and last year's earthquake in Haiti.

As the chief scientist for Interpol's DVI unit, I'm working to help countries adopt standards so that all scientists and police use the same methods when assisting with the identification and repatriation of bodies after these events.

WHAT OTHER SERVICES DO YOU OFFER POLICE?

We also conduct human bite mark analysis in cases where teeth are used as a weapon. In fact, this is very common in homicides and both heterosexual and homosexual assaults — and not just from the aggressor. Teeth are one of the few weapons a victim can use to resist attack. So we analyze the bite marks from either a victim or a suspect to attempt to establish linkages.

We can also analyze bites on food found at crime scenes.

Suspects often spend a great deal of time at a scene and take bites out of everything from chocolate bars to sandwiches and apples and leave these behind.

WHAT ABOUT DNA FROM A BITE?

We've been able to develop a method that's now widely used for extracting DNA from dry saliva left on skin from biting, kissing or even licking, without getting contamination from the skin's DNA.

It involves two swabs — a wet one to wash the skin and a dry one to collect the moisture and DNA from the saliva.

CAN YOU TELL US ABOUT THE METHOD YOU DEVELOPED TO EXTRACT DNA FROM TOOTH AND BONE?

We use a freezer mill and liquid nitrogen to freeze tooth and bone fragments until they're so brittle they will shatter.

That produces a fine powder from which the DNA can be extracted and analyzed. It is this technology that the lab is most known for. In fact, most bones and teeth found in Canada that need this type of analysis are sent to us.

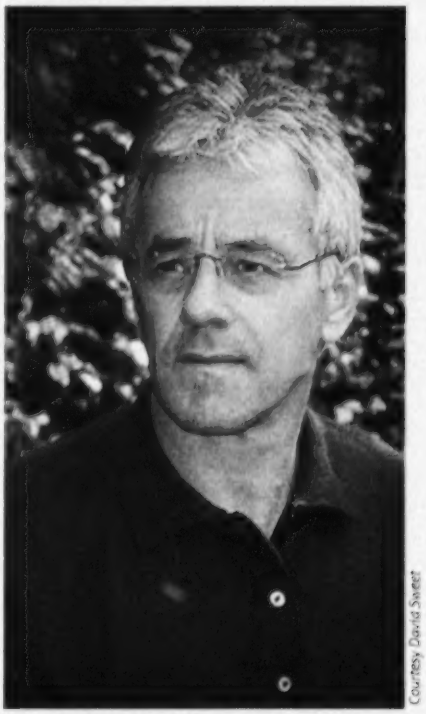
HOW OFTEN DO YOU GET REQUESTS FROM CANADIAN POLICE OR POLICE LABS?

We get about 50 to 60 calls a year from police officers asking for advice and we get between 15 and 20 DNA requests per year from police asking us to analyze the DNA ourselves.

We take about six DNA cases from police, 12 from coroners and 12 bite cases a year. Many police labs just don't have the time or capacity, especially in particularly unusual cases. And while not all cases go to court, we are called to testify on our findings about eight to 10 times a year.

DO YOU TRAIN POLICE TO TAKE ON SOME OF THIS WORK AS WELL?

I currently teach bite mark evidence recovery and victim identification at the Canadian Police College in Ottawa every other summer, as well as part of the post-disaster identification course at the College.



Courtesy David Sweet

As a forensic odontologist, Dr. David Sweet offers a range of services, including disaster victim identification, human bite mark analysis and DNA extraction from tooth and bone.

WHAT CHALLENGES DO YOU FACE AS BOTH A SERVICE PROVIDER AND A RESEARCH LAB?

Police labs depend on us for service. And with cutbacks in budgets and with police forces worried whether they will be able to afford things like winter tires, they may not be able to afford a consultant or to refer cases to us. If there was a cutback in casework, there's a real possibility our lab would have to run a deficit or close.

As a university research lab, we don't have a big budget. And our research is not supported by traditional academic funding. We depend on fee-for-service casework to survive.

Crime scenes are becoming more complex and difficult to process. We'd like to be able to do more research to develop and apply new technology to get us at the level that would make us better at our jobs. Canada doesn't currently have the infrastructure to provide funding for this research, but hopefully we'll find a resolution.

JUST THE FACTS

Police are often the first point of contact in situations of domestic or family violence, which can involve spouses, partners, children and seniors. As these facts show, the recognition of and approach to this global problem is complex and varied.

Statistics Canada found that nearly 40,200 incidents of spousal violence were reported to police in 2007, which represents about 12 per cent of all police-reported violent crime in Canada. However, these incidents have declined, decreasing 15 per cent between 1998 and 2007.

In addition to housing, the services most commonly offered to Canadian women and children escaping abusive situations are transportation, short-term counselling, advocacy, safety or protection planning and housing referral, each provided by about nine in 10 shelters.

In 2005, a World Health Organization review of 35 countries found that between 10 and 52 per cent of women reported being physically abused by an intimate partner at some point in their lives. Between 10 and 30 per cent of women said they had suffered sexual violence by an intimate partner.

The number of reported cases of spousal violence against women in Singapore between 1998 and 2006 has steadily declined from a high of 2,360 in 1990 to 1,135 in 2006. The country credits increased public awareness and better access to assistance through referrals from police to Family Service Centres for early intervention.

New Zealand Police estimate that one woman is killed by her partner or ex-partner every five weeks and 10 children die every year as a result of family violence. The country's Women's Refuge, an independent community organization run by women, assisted some 20,000 women and children in 2009.

The United Nations violence study estimated that between 133 million and 275 million children worldwide witness violence at home each year, with 4.6 to 11.3 million of these children living in developed countries.

In Europe, the European Women's Lobby estimates that between 20 and 25 per cent of women have been subjected to physical violence by a partner – approximately one in five. Some 12 to 15 per cent of women are estimated to have been in a violent relationship after the age of 16.

A report from the European Commission suggests that between 40 and 70 per cent per cent of men who use physical violence against their partners are also violent towards their children and that about half of the female victims also abuse their children.

One incident of domestic violence is reported to the police every minute in the United Kingdom. On average, two women a week are killed by a male partner or former partner.

The U.K.'s Women and Equality Unit reports that domestic violence against women has the highest rate of repeat victimization of any crime — 35 per cent of households see a second incident within five weeks of the first.

In 2004, the U.K. estimated its annual total cost of domestic violence at £23 billion. This included the costs of police, the criminal justice system, healthcare, social services, emergency housing, civil legal support, other services and loss to economic output.

Finland estimates the cost of domestic violence to be approximately €91 million a year, Spain €2.4 billion and the Netherlands €151 million.

Statistics from the United Nations Development Programme suggest that between 30 and 45 percent of women in Latin America and the Caribbean suffer some form of physical, sexual or psychological domestic violence. The cost of that violence is equivalent to two percent of that region's Gross Domestic Product.

The Centers for Disease Control and Prevention in the United States report that women experience about 4.8 million intimate partner-related physical assaults and rapes each year.

Men are the victims of about 2.9 million intimate partner-related physical assaults.

According to the U.S. Department of Justice, American Indian and Alaska Native women experience the highest rates of intimate partner violence.

Germany has no specific penal law on domestic violence, however, laws in the individual Länder, or federal states, allow for removal of an abusive partner in cases of spousal assault. In Berlin alone, there are some 3,600 cases annually of domestic violence resulting in injury.

The term "violence against women" is not used in the Greek penal code, which considers all people equal under the law. Domestic violence is covered only where there is physical assault or visible injury.

SAFETY AND SECURITY STREAMLINED

WEB-BASED TOOLS HELP BETTER MANAGE MAJOR EVENTS

By Ashley Bedard, Contributing writer

As Canada's national police force, the RCMP often takes the lead on security for major events. When Vancouver won the bid for the 2010 Olympic and Paralympic Games, RCMP Protective Policing recognized a need for new technology to manage major events and the tremendous volume of security background checks required to grant individuals access to venues. With no suitable software or tools on the market, the RCMP developed its own.

EVENT MANAGEMENT

To address major events management, the RCMP developed the web-based Event Management System (EMS), a user-friendly tool for managing the planning, mobilization and situational awareness phases of an event.

The planning module allows coordinators to assign and manage tasks and upload shared documents. A collaborative tool, it can handle hundreds of users at once, including partner agencies. For example, the Ontario Provincial Police shared information through the EMS planning module for the G8 and G20 Summits in Toronto, for which the RCMP was also the security lead.

The mobilization module facilitates human resource management for major events. A coordinator can set quotas for roles and shifts needed to secure venues or areas, and assign specific qualifications to each position.

The EMS connects to the RCMP's Human Resource Management Information System, making it easy to search for people who match those requirements. Once people have been identified and accepted into the event, they can go online to view shift details, instructions and travel and accommodation information.

Insp John McCarthy, the RCMP officer in charge of mobilizing more than 6,000 people for the G8 and G20 Summits, and his team were the first to use the full EMS mobilization module.

"We gave it a real workout," says McCarthy. "Having used the EMS, I can't imagine how people did this before."

The situational board module of the EMS is used to capture incidents such as protests and accidents at events. Occurrences are logged and viewed on a board or as icons on a mapping feature called the Common Operating Picture. Clicking on an icon provides security officials with incident details and applicable standard operating procedures, which helps track occurrences and reposition resources when necessary.

Although built for planned major events, the EMS has great potential for unplanned events, such as a potential bomb threat or a major accident, for example.

Hypothetical events can be created in the EMS to identify resources or crisis teams, standard operating procedures and maps.

"Should the event actually occur, this information would be ready," says Emmanuel Mazy, EMS team leader. "This kind of crisis planning can save time and lives."

SECURITY CHECKS

To gain access to venues for major events, individuals such as staff, volunteers and members of the media must seek accreditation through a security background check. To manage the high volume of requests, the RCMP developed the web-based Security Accreditation Management System (SAMS) to work alongside the EMS.

Whereas security officials previously had to search several databases separately in a labour-intensive process, SAMS coordinates the process of checking various law-enforcement databases.

Depending on an event's requirements, this could include: the Canadian Police Information Centre, the Police Reporting and Occurrence System, and BC's Police Records Information Management Environment as well as those of partner agencies such as the Canada Border Services Agency, Citizenship and Immigration Canada and the Canadian Security Intelligence Service. In May 2010, SAMS was expanded to connect to the Police Information Portal and Interpol.

An individual's information is collected by the federal agency responsible for the event and entered into SAMS, where the RCMP and participating agencies can then access it. Each agency searches its own databases and marks the file as green or red in SAMS.

When green marks are returned by all agencies, the RCMP informs the host agency that the person may be accredited. If a red mark is returned by one or more agencies, an RCMP risk assessor evaluates the information and makes a recommendation.

Using SAMS, the RCMP conducted more than 205,000 security background checks for the 2010 Olympic and Paralympic Games. The system was also used for United States President Barack Obama's visit to Ottawa in 2009 and for the G8 and G20 Summits in 2010.

"Without SAMS, this volume of background checks would have been a challenge," says Supt Brendan Heffernan, the RCMP's director of major events. "SAMS has enhanced our capacity to secure major events."

Through their successful use at major international sporting events and meetings hosting world leaders, the EMS and SAMS are proving to be valuable technological advances that are helping the RCMP and its partners ensure safe and secure events, while saving both time and money.

RCMP members make their way through a crowd at Whistler Village, British Columbia while performing a security patrol during the 2010 Olympic Games.

Canadian Forces Combat Camera

RAMPING UP ON WILDLIFE CRIME

THE FIGHT AGAINST THE ILLEGAL EXOTIC PET TRADE

By Denis Labossière, Environment Canada

Canadian police and consumers don't have to look any further than their local mall pet shops, big-box stores and other known and trusted retailers to witness the growing popularity of exotic pets such as lizards, turtles and snakes, among others.

However, even though the animals on display might not be endangered, the reality is their presence in the country might not even be legal.

This is why Environment Canada became involved with Operation RAMP, a worldwide operation coordinated by Interpol that involved 50 other countries across five continents against the illegal trade in reptiles and amphibians.

During the two month-long operation, Environment Canada investigated individuals and companies and conducted inspections of premises such as seaports and wholesalers, gathering intelligence, facilitating the exchange of information between Interpol's police member countries participating in the operation.

While Canadian statistics are still being collected, Interpol estimates that the thousands of animals and items such as leather products, illicit firearms and drugs that were recovered and seized have a total worth of more than 25 million euros.

"The illegal smuggling of animals is a worldwide concern, often involving networks of organized criminals," says Gord Owen, Chief Enforcement Officer for Environment Canada.

"The solution lies in the concentrated global effort of enforcement agencies, working together to fight this problem."

INTERNATIONAL AGREEMENT

Environment Canada is the federal government department responsible for administering and enforcing the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), an international agreement to protect endangered species. Canada is one of more than 150 countries that have signed the convention.

In Canada, CITES is implemented through the *Canadian Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act.*

The act applies to the following animal and plant species:

- Species on the CITES control list;
- Foreign species whose capture, possession, and export are prohibited or regulated by laws in their country of origin;
- Canadian species whose capture, possession, and transportation are regulated by provincial or territorial laws;
- Species whose introduction into Canadian ecosystems could endanger Canadian species.

CITES operates through an import/export permit system. Animals and plants are classified into one of three appendices depending on their severity of endangerment. More than 30,000 species are listed.

COLLABORATION

Environment Canada's Wildlife Enforcement officecollaborateswithotherfederal,provincial and international organizations to ensure that the interprovincial and international trade of native and non-native wild plants and animals and their products is carried out in a legal manner.

Last year, Environment Canada took a big stride towards increasing awareness of wildlife and environmental crime by creating a free subscription service for enforcement notifications, which are quick briefs about arrests, or convictions under the environmental and wildlife protection laws that are administered by Environment Canada.

The service is an excellent way for police and the public to stay current on what Environment Canada is doing to protect the natural environment from poachers, polluters, and toxic waste smugglers.

HELPING CONSUMERS SHOP WISELY

Police can also help by reminding members of the public to be conscious of their choices when buying exotic animals and to ask all pet retailers questions about where and how the animals were obtained. Consumers can speak with other pet shops or local conservation officers to see if any complaints have been lodged against a particular animal dealer.

Courtesy Interpol

Operation RAMP highlighted the illicit trade in endangered reptiles and saw the seizures of thousands of animals, such as these lizards in China.

Many consumers are also unaware of the methods in which some exotic animals are captured, including many of those seized during Operation RAMP.

For example, reptiles are often caught in brutal ways. In countries where chameleons are collected, they can be knocked out of trees with a pole and then simply picked up and placed into a bag, without looking if they are wounded.

Reptiles may also be packed closely together during transport, sometimes piled on top of each other. Close confinement often result in abrasions and lacerations, loss of claws and digits, broken tails and other injuries.

As a result of habitat loss and overharvesting for both legal and illegal commercial and personal purposes, many wild animals are threatened with extinction in Canada and around the world.

By making informed decisions, consumers can help fight wildlife crime while protecting both Canadian and foreign species of exotic animals.

HARD PILL TO SWALLOW

NORTHERN COMMUNITIES TACKLE PRESCRIPTION DRUG-RELATED CRIMES

By Chief Paul Cook, North Bay Police Service & Ontario Association of Chiefs of Police Director Zone 1A and Reggie Caverson, Senior Health Promotion Consultant, Centre for Addiction and Mental Health

The misuse, abuse and diversion of prescription drugs are nothing new. More recently, however, prescribed narcotic pain-relievers such as Fentanyl, Methadone, Percocet, Percodan and pure oxycodone-based drugs such as OxyContin have all been implicated as a factor in increased addiction, crime and overdose deaths in the province of Ontario, Canada.

Between 1991 and 2004, the Canadian Medical Association estimates that the number of overdose deaths related to oxycodone-based drugs in Ontario increased five-fold, totaling some 300 deaths per year. Ontario's Drug and Alcohol Treatment Information System indicates that the number of people admitted to treatment programs for OxyContin addiction has doubled in northern Ontario between 2004 and 2009.

The number of public and private Methadone clinics to treat opioid addiction has also increased.

And according to the 2009 Ontario Student Drug Use and Health Survey, the province has seen a rise in the non-medical use of prescribed drugs by youth — and most report getting them from home.

DISCOVERING THE PROBLEM

The Ontario Association Chiefs of Police (OACP), which represents all police leaders in Ontario, divides the province into six zones. Police agencies in northeastern Ontario, designated as OACP Zone 1A, collectively serve a population of just fewer than one million people.

Although police in the northeast, which consist of the Ontario Provincial Police as well as one Aboriginal, three town and four municipal police services, experience some organized crime and gang-related illicit drug activity, they began witnessing a wave of armed robberies targeting pharmacies as well as other crimes and overdose deaths related to prescription drugs.

At the same time, the Northern Ontario Area office of the Centre for Addiction and Mental Health (CAMH) also became aware of various community efforts across the north attempting to address prescription drug-related issues that were being reported by partner agencies and other members of the community.

CAMH met with police leaders in the region and they agreed to collaborate on a survey to better understand the extent of the problem from a police perspective and to shed some light on prescription drug-related crime and diversion in northeastern Ontario.

SURVEY

In developing the survey, it became apparent that police do not share the same data management system.

As a result, there was no easy way to retrieve some of the information that they collect, such as break-ins where prescription drugs are stolen or are a factor in the crime. Also, this information is often not known at the time of the incident.

Therefore, the survey asked police questions specifically related to the number of prescription drug-related crimes — as identified under the *Controlled Drugs and Substances Act* — and their experiences with them.

It also asked for more anecdotal information about what police think is contributing to the problem, the types training, resources and prevention activities that are in place as well as what actions they recommend.

STATISTICS

Police services were asked to provide information for a one-year period from Nov.1, 2008 to Nov. 1, 2009 on: population of area policed; total number of occurrences, including drug-related crimes; and total number of crimes specifically related to prescription drugs — trafficking, possession for the purposes of trafficking, pharmacy robberies, fraud and prostitution.

While 667 actual prescription drug-related crimes were recorded compared to a total of 232,571 other occurrences and crimes in the region, this relatively low number should be taken into perspective.

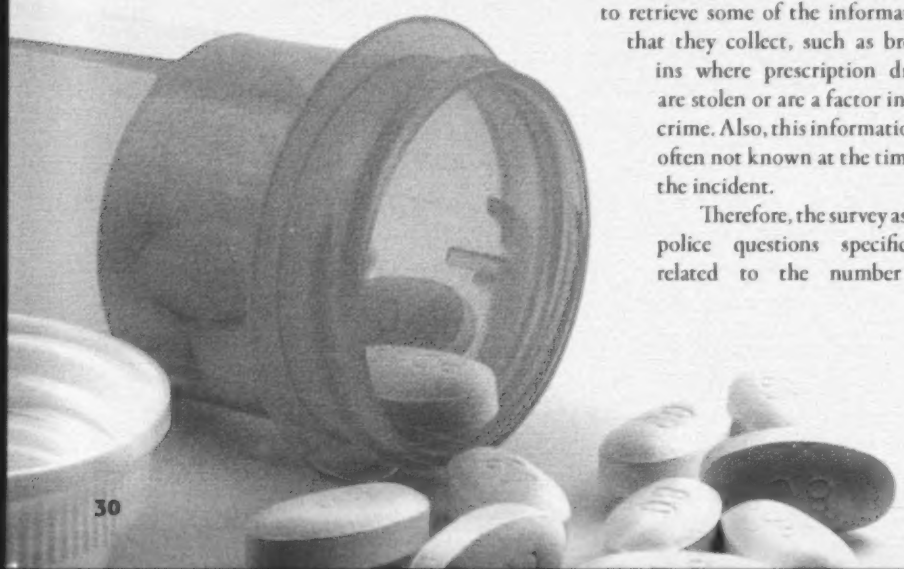
For example, pharmacy robberies, which in most cases were recorded as armed robberies, seldom happened in previous years. And in most of these robberies, OxyContin was the drug that was demanded.

ANECDOTAL EVIDENCE

Each police service was also asked to respond to questions regarding prescription drug misuse, abuse and diversion.

Without exception, each police service reported the concern that prescription drugs are a factor in various thefts, robberies and break and enters as well as other crimes and occurrences, including, but not limited to: overdose-related sudden deaths; home invasions; thefts/break and enters targeting pharmacies and methadone clinics; violent and non-violent crimes, including assault; impaired driving; and panhandling.

Prescription drugs are also showing up with more frequency in regular police drug operations, including undercover operations. Police in the northeast identified oxycodone-



based drugs such as OxyContin and Percocet and other opioids such as Morphine and Fentanyl as the drugs that they come across most often.

SUPPLY AND DEMAND

Most police services reported that prescription drugs are readily available and easily accessible. Similar to other drug use, police say they feel that current problems in the northeast are impacted by supply and demand.

On the supply side, some police say they believe that some physicians over-prescribe. They say they are frustrated there are no guidelines or a centralized electronic database to monitor or track prescriptions in Ontario. Such a system would help flag the amount prescribed by a physician or dispensed by a pharmacist and detect fraud, doctor shopping, as well as altered, forged or stolen prescriptions.

Police also noted that because prescription drugs are relatively easy to obtain and very lucrative to sell — due to the high profit margin and comparative ease to carry prescription drugs versus illicit drugs — that dealers are now turning to prescription drugs rather than illicit drugs such as cocaine.

In terms of demand, police reported that they are well aware that prescription narcotics used to treat pain are highly addictive and very difficult to stop using once dependent and that some users do not seek treatment because of stigma.

They say they also recognize that those who are addicted sometimes resort to criminal behaviour to purchase drugs to support their dependence.

Other police services noted, however, that they feel that there is also less stigma attached to using prescription drugs than illicit drugs, which might account for some of the problem.

ENFORCEMENT AND PREVENTION

Internally, some police services reported that they generate intelligence reports on drugs, including prescription drugs, to inform their officers.

Others reported street-level drug enforcement, undercover drug operations, use of informants and joint undercover operations.

Some police services also engage in various drug officer and front-line officer training efforts, including the use of video resources and materials on prescription drug enforcement developed by the Ontario Police Video Training Alliance and the Ontario Police College.

Some also participated in a forum hosted by CAMH and the Northern Ontario School of Medicine about preventing and treating opioid dependency.

In one community, police are working with pharmacies to teach them how to minimize their risk of armed robberies. Some police services are also engaging in broader community action plans that include prevention strategies with convenience stores, which can be robbed by dependent users that need an alternate source of income to buy drugs.

A handwritten note used in the armed robbery of a pharmacy in Northern Ontario.

Courtesy Sudbury Police Service

Police have also developed local task forces to address the problem, hosted community forums and made presentations to municipal leaders, community groups and schools.

SOLUTIONS

Since the initial concern expressed by police leaders in northeastern Ontario and the subsequent survey and results, it has become increasingly clear that the problem of prescription narcotics is not just a regional problem. It is one that is being tackled across the province and elsewhere in Canada and the US.

Since the time of this survey, changes have begun at the national and provincial level.

Nationally, various medical experts and others have completed the development of the National Opioid Prescribing Guidelines for Non-Cancer Chronic Pain and training is being planned across the country for physicians and pharmacists.

In Ontario, representatives from the OACP and other police agencies including the Royal Canadian Mounted Police, the Ontario Provincial Police and the Toronto Police Service were invited to participate in a College of Physicians and Surgeons of Ontario's committee, which has developed recommendations to prevent diversion.

Other committees identified recommendations on education, access to health resources and the need for a prescription tracking system, which the provincial ministry of health is now in the process of developing.

CONCLUSION

Although there is no plan to repeat this survey, it did call attention to the need for ways to better document crimes/occurrences that involve prescribed narcotics. It also helped to underscore the complexity of both the problem and the solution.

A single bullet approach is not the answer. To successfully address misuse, abuse and diversion, a comprehensive and balanced strategy that addresses both supply and demand, involving multiple key sectors in health and justice is required.

Only time will tell if these strategies, guidelines and policies will make a dent in the current problems police and others face.

But we must develop an overall approach now so that history does not repeat itself with new drugs that emerge on the market.

The views expressed in this paper are those of the authors and do not necessarily reflect those of the Ontario Association of Chiefs of Police or the Centre for Addiction and Mental Health.

LATEST RESEARCH IN LAW ENFORCEMENT

The following are excerpts from recent research related to justice and law enforcement. To access the full reports, please visit the website links at the bottom of each summary.

IMPROVING PUBLIC CONFIDENCE IN THE POLICE: A REVIEW OF THE EVIDENCE

By Andrew Rix, Faye Joshua, Mike Maguire and Sarah Morton for the UK Home Office

It is important that the public feel confident in the police and other crime-fighting agencies. We know that crime has fallen considerably in the last 10 years but the public are not feeling the impact of this and believe crime is rising.

In 2008, the government published the Green Paper *From the neighbourhood to the national: policing our communities together* which proposed a single top-down target to replace the multiple targets previously used to monitor police performance.

The single target is to improve levels of public confidence that the police and local councils are dealing with the crime and anti-social behaviour issues that matter locally, as measured by the British Crime Survey.

Individual targets were set for each police force and published in March 2009. To inform evidence-based guidance to forces on how to improve performance, a literature review was commissioned to summarize the best available evidence on what works in terms of improving public confidence in the police and to identify what other interventions look promising and merit further exploration.

The review consisted of a rapid assessment of the available literature on public confidence in the police as well as an assessment of local practice schemes with the potential for wider implementation. The interventions were classified into three main categories: what works, what looks promising and potential pitfalls.

Due to the tight timescale for the review, it is possible that some relevant evidence has not been covered. It is also possible that the categorization of some interventions into what works and what looks promising could change following further evidence. It is, however, assumed that all key studies have been included.

Overall the evidence suggests that the strategies most likely to be effective in improving confidence are initiatives aimed at increasing community engagement. Three out of the four interventions classified in the "what works" findings all included an element of communicating and engaging with the community and this was also found in many of the "what looks promising" interventions.

There is strong evidence to support the continuation and embedding of neighborhood policing to increase confidence, though the quality of implementation is important as previous Home Office research has found that all three components of neighbourhood policing — targeted foot patrol, community engagement and effective problem-solving — need to be fully delivered to achieve intended impacts.

A high quality of implementation is required to achieve intended impacts and local monitoring and evaluation of interventions should be undertaken to measure whether they are achieving their intended impact. It should also not be assumed that the same intervention will work in every area and in every situation. The best practice for any community is one that fits their needs and conditions and can be delivered with available resources.

TO ACCESS THE FULL REPORT, PLEASE VISIT: HTTP://RDS.HOMEOFFICE.GOV.UK/RDS/INDEX.HTML

RECOVERY OF HUMAN REMAINS IN A FATAL FIRE SETTING USING ARCHAEOLOGICAL METHODS

By Gregory Olson for the Canadian Police Research Centre

Much of the current literature available to fire investigators focuses on fire suppression, fire investigations and methods.

This study aims to assist fire investigators in understanding the value of the application of archaeological recovery methods at fatal fire scenes. It also intends to provide insight into the essential skills used in these methods.

The anticipated outcome is an increase in both the amount of human remains recovered and associated artifacts surrounding the death, thereby, improving the quantity and quality of critical evidence.

The primary objective of the study is to employ and contrast the methods for recovery of human remains in a fire setting in order to increase the contextual and associational data acquired to reconstruct the event more accurately.

Basically, this study involves a three-fold method: involving the use of comparative fires, the application of a questionnaire to more than 500 historical fatal fires within the province of Ontario and fire excavations conducted in the everyday course of employment for this author.

The comparative fires involved existing standing structures, pre-prepared with pig cadavers and artifacts associated with homicide and allowing a total burn to take place.

Personnel who lacked formal training in the disciplines of archaeology and anthropology conducted the initial search for human remains. Any recovered remains and artifacts were photographed, mapped and collected.

A second search team, which consisted of individuals experienced and trained in archaeological techniques, was then utilized. A proper archaeological-style grid search was undertaken with all or any artifacts and human remains photographed, mapped and recorded.

The quantitative relationship between the items recovered by the two teams was profiled and documented. At this point, there have been four comparative fires conducted.

The historical portion of this study involves the application of an extensive questionnaire to over five hundred historical fires. The purpose of the questionnaire was to capture existing data, involving the methods employed by previous fire investigators at similar types of scenes, by way of scene

comparison and rate of recovery.

The "day-to-day" scene data relates to actual fatal fire scenes excavated by the author. The data obtained, including the amount of human remains recovered and artifacts associated to the fatal fire scene excavated from the very beginning, are profiled in this method.

TO ACCESS THE FULL REPORT, PLEASE VISIT: HTTP://WWW.CSS.DRDC-RDDC.GC.CA/CPRC/INDEX-ENG.ASP

PERCEPTIONS OF THE SOCIAL HARMS ASSOCIATED WITH KHAT USE

By Wendy Sykes, Nick Coleman, Philly Desai, Carola Groom, Mohamud Gure, Radhika Howarth of Independent Social Research for the UK Home Office

This report describes the findings from a study exploring the perceived social harms associated with the use of khat. The study comprised focus groups and interviews with: members of the Somali, Yemeni and Ethiopian communities, members of the wider community as well as practitioners, including those from health, education and enforcement fields.

In addition, a short survey of Drug Action Teams (DATs) was conducted to gauge the availability of treatment service provision for khat users.

The study found that khat chewing was reportedly widespread in all three communities and considered by users, non-users and many practitioners to be a normal, socially accepted practice, cutting across the social spectrum. Heavy khat use was perceived as problematic.

Although users were mostly perceived to be men, khat chewing was also thought to be on the increase among women, young people and people born and brought up in the UK.

Perceived social harms of khat were mainly linked to heavy use, which some community and practitioner respondents also thought could be symptomatic of underlying social problems that were unrelated to khat use.

Perceptions of the harms associated with khat included harm to: physical and mental health; work and finances; and relationships, marriage and family life. Some respondents regarded khat as a barrier to community integration and progress in the wider UK society.

There were very few reports of associations between khat and crime or anti-social behaviour.

Some form of government intervention in relation to khat was favoured by most community respondents and practitioners. A range of suggestions for government intervention were made such as the regulation and control of import and sales, more education and awareness and training of health professionals and community workers. Some favoured a total ban.

Expressed demand for treatment or support services was perceived to be low. Moderate users were unlikely to see khat as a problem and it was reportedly unusual for heavy khat users to come into contact with services except for health reasons possibly related to their use of khat.

Some community and practitioner respondents felt that existing treatment and service models were not culturally appropriate. Services with explicit links to other kinds of drug or alcohol treatment were seen as unlikely to appeal to khat users, particularly as it was thought that most khat users did not drink or take other drugs.

Strong links with communities tended to be reported by DATs as crucial to effective service provision and developing and sharing best practices.

Most practitioners and some DATs felt that there was a continuing need to raise awareness of the potential risks of harm, provide information about harm minimization and work with venues where khat is sold and consumed to reduce public health risks and minimize any local nuisance.

TO ACCESS THE FULL REPORT, PLEASE VISIT: HTTP://RDS.HOMEOFFICE.GOV.UK/RDS/INDEX.HTML

A report from the U.K. Home Office explores the perceived social harms of khat, a euphoria-inducing stimulant popular in Africa but illegal in Canada and most western countries.

POOLING RESOURCES

MVA RESPONSE PROCEDURE IMPROVES USE OF FIRE, POLICE SERVICES

By Len Garis, Fire Chief, City of Surrey and C/Supt Fraser MacRae, Surrey RCMP

A partnership between the fire and police services in one British Columbia city is improving the response to motor vehicle accidents (MVAs) while freeing up resources.

Implemented in 2005, the joint initiative by Surrey Fire Service and Surrey RCMP has reduced response duplication by an average of 60 per cent, by streamlining response protocols and handing over some scene management capacity to fire crews.

One of the main results is that RCMP are no longer attending minor "fender benders" that used to eat up significant time and resources, while fire crews no longer have to wait for the RCMP to arrive to start clearing the scene.

"We can get multiple MVAs during the day at rush hour, and so the assistance of the fire department has been immeasurable," said Cathie Matthews, Manager of Surrey RCMP's Operational Communications Centre.

OVERLAPPING SERVICES

About 4,000 MVAs occur in Surrey each year, including those involving injuries or fatalities and those involving only property damage. Calls are dispatched to the appropriate emergency responders — police, fire and ambulance — based on their established response protocols.

For example, while the fire service responds to both categories of MVA, the RCMP's protocol requires police to respond to all injury accidents, but only those property damage incidents with a suspicion of criminality, such as impaired driving or assault, for example, or significant traffic control issues, such as major traffic jams.

Overlap between fire and RCMP responders was common before because Surrey RCMP would frequently respond to property damage calls that did not fit the protocol criteria. Once there, they would often spend 30 to 45 minutes processing the scene.

Because scene management was strictly a police responsibility at the time, responding fire crews had to wait for police to arrive before taking any action — such as requesting tow trucks, clearing the roadway, directing traffic, facilitating the transfer of insurance documents, and leaving the scene.

At times, the fire crews waited for more than 25 minutes for police to arrive.

This was even the case during minor collisions where there was clearly no injury or criminal reason for the police to attend. Because many drivers still have the misconception that they must wait for police to arrive to move their vehicle, the resulting traffic tie-ups could be significant.

NEW PROCEDURE

In 2005, Surrey police and fire representatives met to address the inefficiencies caused by the response procedures. The new protocol they developed allowed fire officers to assess and manage the scene of MVAs where there were no injuries, such as minor collisions.

Fire officers arriving first at an MVA are now assigned responsibility for determining if police involvement or attendance is required.

The RCMP is still called to MVAs in cases involving an injury or death, a criminal offence, individuals who insist on police attendance, individuals from outside the

Surrey fire officers arriving first at an MVA are now assigned responsibility for determining if police involvement is required.

Surrey RCMP

region, violation of a person's rights, traffic control issues, or an emergency/city vehicle. However, all others can now be managed by fire crews.

When the new protocol was established, training was provided to fire personnel to prepare them for the new responsibilities.

The RCMP was initially involved in establishing the training parameters, including scene assessment and preserving evidence. But now MVA scene assessment and management is part of the training Surrey Fire Service provides its members.

BENEFITS

The result has been more efficient use of both fire and police resources, according to Surrey MVA statistics from 2006 to 2009.

RCMP now attend about 40 per cent of all MVAs in the city. The reduced attendance is saving the RCMP an average of 900 hours per year — and this estimate does not include time officers had previously spent at MVA scenes conducting interviews and writing reports.

The initiative has also reduced the time fire crews spend responding to MVAs, freeing them up for other priorities.

"If the RCMP aren't needed, we're able to more efficiently clear the scenes – tow trucks can be called, we can push the cars off the road, tell people to exchange information and go on their way," noted Surrey Deputy Fire Chief Jon Caviglia.

"It makes sense that we're no longer duplicating services, and it makes sense that those resources can be allocated elsewhere."

Another benefit is that Surrey's MVAs are cleared more quickly, reducing the impact on the community and other motorists.

"At times, one could expect to have up to five emergency vehicles, including fire, police and ambulance, at a minor motor vehicle incident," said Surrey Deputy Fire Chief Karen Fry.

"This partnership not only reduces traffic congestion, it also reduces the carbon footprint in our city."

But the overall success of the initiative would not have been possible without the strong relationship between Surrey's fire and police departments, and their shared interest in finding innovative ways to improve efficiency and serve the community better.

"It's all about making the right decisions to manage our resources by allocating only the responders required at an emergency incident," Fry said.

"Our goal is to provide the best and most efficient response of resources to emergency incidents in the City of Surrey, and this model saves our partner agency, the RCMP, time to respond to more critical incidents."

Matthews says that the strategic placement of fire halls throughout the community is another reason it makes sense for fire crews to manage MVAs that don't require RCMP involvement.

Some of the RCMP zones cover large areas, which means the closest patrol car may be a considerable distance from an MVA scene.

"The partnership is one that needs to be maintained and developed," Matthews said. "I think the fire department can be of greater assistance to us because of their location and availability. I'd like to see the partnership grow even further."

Surrey RCMP

Police are saving an average of 900 hours per year as the result of a new protocol between the RCMP and Surrey Fire Services that allows fire officers to assess and manage some motor vehicles accident scenes.

FURTHER EXPANSION

In fact, the city could see similar results if the initiative was to expand to include the ambulance service, which sometimes attends MVAs where its presence is not required.

For example, fire officers arriving first at an MVA could cancel the ambulance if it was not needed for treatment or transportation.

This new protocol concept, which is currently being explored, would result in a more efficient use of the community's three primary emergency response resources.

CONCLUSION

At a time when governments are struggling to reduce costs while meeting increasing service demands, Surrey's new MVA response pr'ocess illustrates the potential benefits of greater cooperation between agencies and jurisdictions that provide overlapping services — improved service, more efficient use of resources and reduced costs and duplication.

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C/Supt Fraser MacRae is the officer in charge of the RCMP detachment in Surrey.

BY THE NUMBERS

City of Surrey, British Columbia, Canada

Population: 462,000

Motor vehicle accidents per year: 4,000

RCMP hours spent attending MVAs in 2005: 1569

RCMP hours spent attending MVAs in 2009: 774

Average time saved by RCMP since protocol with Surrey Fire Service: 900 hours per year

SAFER ROADS ONE TWEET AT A TIME

By Associate Professor Kelly W. Sundberg, Mount Royal University, Calgary, Alberta, Canada and Insp Dennis Watson, Staff Officer to the Deputy Commissioner (Road Policing), Victoria Police, Melbourne, Australia

In today's high-tech environment, police services are constantly challenged with finding new technologies they can use to improve operational efficiencies and increase community safety.

Choosing a new technology is no small feat. They often carry a hefty price tag and require specialized knowledge. And by the time a new technology is finally selected, a more advanced one becomes available.

But the Victoria Police in Australia have embraced a new technology that is easy to use, adaptive, effective and free of charge. In 2009, like a tech-savvy teenager, the police service began tweeting its daily activities and thoughts via Twitter — one of the most popular and widely used social networking services in the world.

With more than 75 million users and in excess of 50 million tweets, or messages, per day, Twitter has become a standard application on virtually every smartphone and it has also established itself as a staple mode of communication among today's youth.

Until recently, governments, and in particular police services, have been slow to take advantage of social networking. But as with the case of Victoria Police, this is quickly changing.

TRAFFIC SAFETY CAMPAIGN

In July 2009, the Victoria Police began integrating Twitter as part of their four-day intensive traffic enforcement campaign that focused on curbing dangerous driving.

In addition to setting up pylons, road flairs, and roadside screening devices, the traffic officers also logged into the Victoria Police Twitter account.

Every time an impaired driver was intercepted, an officer sent a live tweet informing the world of the enforcement action.

In 140 words or less, a message such as:"Young man 26 just blew .13 – he'll be walking 7km to get home and now will be taking transit after losing his licence for 14 months" was broadcast live to the smartphones and computers of Twitter users, warning them of the current roadside screening activity taking place.

RESULTS

As a result of this innovative public awareness campaign, thousands of Victoria State citizens with Twitter accounts began following the Victoria Police on the social networking application to receive live updates from the police as a means of staying updated on local traffic enforcement activities.

According to the Victoria Police media unit, by the end of the four-day operation, more than one million citizens had received the tweets, increasing traffic safety awareness throughout Victoria State. In fact, during the campaign and those that have followed, the police service has seen six to ten times fewer traffic infractions.

With more than 8,300 followers and upwards of 5,000 tweets and counting, the Victoria Police continue to use Twitter as an integral part of its traffic safety education strategy through notification of enforcement actions and live broadcasting of road conditions and traffic safety tips.

DEMOGRAPHICS

The younger demographic profile of most Twitter users matches the target audience often intended for traffic safety education campaigns.

Research shows that most young people frequently check their Twitter accounts on their smartphones even during a social engagement. Receiving a tweet from local police about community traffic safety measures may persuade an impaired driver to choose an alternative means of returning home instead of getting behind the wheel after having a few drinks.

Therefore, the use of social networking services such as Twitter can provide police with a new means of educating youth about safe driving, which ultimately promotes safer roadways.

CANADIAN POLICE USE

Over the past year, several Canadian police services, including the Royal Canadian Mounted Police, the Toronto Police Service, the Calgary Police Service and the Victoria Police Department in British Columbia, have embraced Twitter as a means of informing the public of their ongoing activities.

Based on the successful use of Twitter by the Victoria Police in Australia, police in Canada can expect similar results.

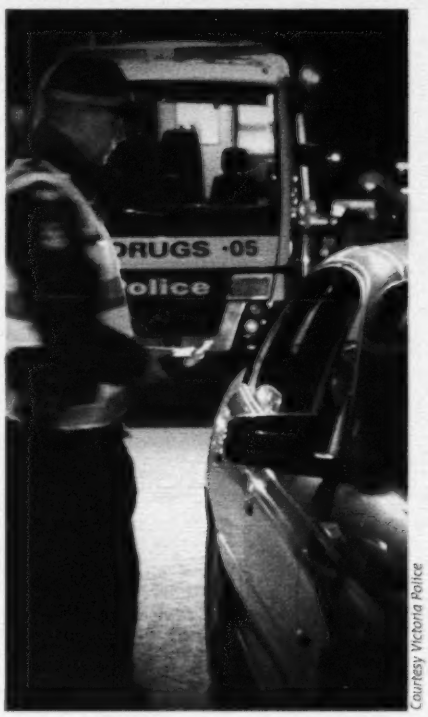
CONCLUSION

Incorporated within an existing traffic safety campaign and promoted via the local media, the use of Twitter by police can provide an extra deterrence factor that may ultimately help keep impaired drivers off the roads.

Twitter can also help police services connect with youth, deter unsafe driving, solicit information from the public in relation to unsolved crimes, assist with recruiting, and ultimately increase the public's confidence in the police.

Although quantitative research regarding the effectiveness of Twitter by police is limited, qualitative evidence suggest it is a worthy endeavour. Future studies will hopefully qualify our belief that social networking can effectively enhance public safety.

Victoria Police in Australia are now using the social networking application Twitter as part of their traffic safety awareness campaigns.



Courtesy Victoria Police